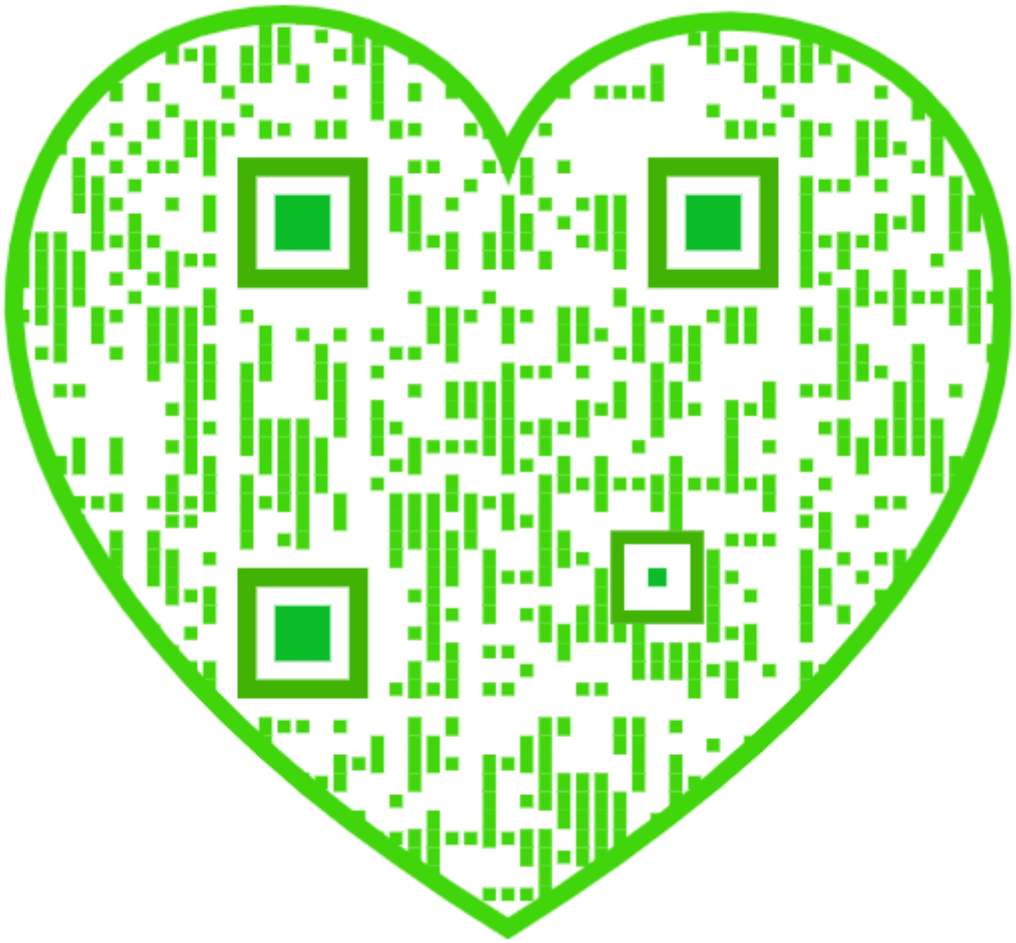

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THE AMERICAN ARCHITECT AND BUILDING NEWS

VOLUME IV

JULY – DECEMBER

1878

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INDEX TO VOLUME IV.

JULY-DECEMBER, 1878.

Abbey. Discoveries at Newcastle, 96
" St. Alban's, Restoration of Roof, 208
Academy of Design. Architecture at the Chicago, 124
Accident: —
Beach Sand causes the Fall of a Floor, 96
Blowing open a Water Main in New York, 96
Boiler Explosion on the Adelphi, 121
Coroner's Verdict in the Mott St. Accident, 2
Elevator Accident at Chicago, 82
Fall of a Chimney, 12
" a House on 53d St., New York, 95
" a House at Washington, 81
" a Piazza, 32
" a Ship at Cleveland, 136
" a Stable Floor, 160
" a Warehouse Floor at Baltimore, 40
" a Wall at Elgin, Ill., 60
" a Vault at the Hartford Capitol, 192
" Elevator in Stewart's Store, New York, 130
" the 42d Street Tunnel, New York, 1, 25, 138, 144
Mining Accident in Nevada, 51
Old Colony R. R. Accident, 190
Accidents: —
Farm Machinery in Frayce, 104
Railway, 152
Responsibilities for Building, 25
Responsibility for Elevator Accidents, 154
Scaffold Accidents, 88
Acoustic Gallery at Linz, 168
Adams and the N. Y. Building Department. Supt., 45
Address of Mr. Barry, President R. I. B. A., 196
Address of President Waller at the Convention R. I. A., 172
Adelphi. Boiler Explosion on the, 121
Aerial Echoes, 126
Æsus. Observatory on, 160
Air in San Francisco. Pure, 112
Albon's Nave. St., 193
Albany: —
Capitol. Mr. Hunt's Paintings at the, 117
Protection at, 112
The State Capitol at, 67, 112, 196
Alfred's Palace, 200
Algeria. Chinese Labor in, 96
Algiers, Railroad to Timbuctoo, 200
America. Oldest House in, 152
American: —
Architecture. Archæology and, 114
" With Precedent and without, 188
Avarin at Paris, 144
Bottom. Archæology in the, 60
Bricks. Size of, 59
Ingenuity, 111
Sculptors in Italy, 22
Vernacular Architecture, 5
Ancient Buildings. Report of the Society for the Protection of, 37
Anderson on Cincinnati Sewage. Col., 153
Anecdote: —
Cuinet's Trick. A, 136
Kate's cte. A Long, 68
Gravestone. What becomes of the, 8
Epitaph. A Curious, 60
Picture Cleaning. The Dangers of, 178
Pictures out of Italy. How to Smuggle, 104
San Francisco Undertaker's Tower. A, 67
Sleeple-Jack's Feat. A, 44
Tests of Strength, 184
Anerold Barometers, 205
A new Painting, 200
Appropriations for Public Buildings. How Made, 1
Arboriculture in the United States, 19
Archæologists as Explorers, 126
Archæology: —
And American Architecture, 114
And the Vernacular Architecture, 143
Assyria. New Explorations of, 152
Cinerary Urns. Curious, 168
Cloister of Old St. Paul's, 128
Cyprus. Mediæval Architecture in, 186
Delphi. Excavating the Temple of, 182
Equestrian Statue found in the Tiber, 106
Indian Mound at Fort Leavenworth, 126
In the American Bottom, 80
Locomotive Relics, 169
King Alfred's Palace, 200
Missionary Work in Asia and Africa, 138
Mosaics at Berlin. Discoveries, 192
Newcastle Abbey. Discoveries at, 96
Olympia. Discovery at, 152.
Olympian Excavations, 68
Porta Nigra at Treves. The, 184
Report of the Society for the Protection of Ancient Buildings, 37.
Roman Antiquities at Strasburg, 176
Rome. Excavations at, 184
Schliemann at Ithaca. Dr., 107
Statue of Valentinianus I., 136
Treasures of Cyrus. The, 129
Via Sacra. The, 192
Walbrook. Roman Remains at, 120
Arches. The Equilibration of, 122
Architect, The, on Mr. Barry's Address to the R. I. B. A., 193
Architect: —
And the Chicago Custom House. The Supervising, 109
Indicted for Fraud. The Supervising, 185
Report of the Supervising, 169
Supervising, Suspension of, 193
The Studies of an, 79
Architects: —
American Institute, Finances of, 201
" " Position of Associates, 190, 201
" " Proceedings of, 201
And Engineers, 54, 64, 89
And Organization, 154
At Paris. International Congress of, 69
Competitions of, 223
Convention of the American Institute of, 149, 168
For Indiana. Board of Consulting, 192
Line on a Building, 81
Position. Difficulties of the Supervising, 64.
Risks, 186, 194
The Legal Responsibilities of, 190, 194
Architectural: —
Copyright, 21
Diploma, 89
Missionary Work, 98
Monographs. New, 192
Professorship at College of City of New York, 38
Reforms, 208
Sinecure, 9
Styles. Domestic, 48
Architecture: —
American Vernacular, 5
Archæology and American, 114
" and the Vernacular, 143
At Chicago. Lecture on, 138
At the College of New York, 17
English and French, 153
Architecture: —
Eight Italian Basilicas, 166
In Cyprus, Mediæval, 186
In Palestine, 117
Irish, 68
Of French Exposition, 204
Paleæthan, 2
Political Caricature in, 44
With Precedent and without. American, 188
Art: —
Awards at the Paris Exhibition, 200
British Schools of, 128
Cincinnati Schools of, 152
Interchange. The, 107
Japanese and Chinese, 109
Lectures of the New York Society of Decorative, 152
Schools. French, 80
" German, 89, 94
Studies, 178
The Decay of Italian, 176
Artificial Stone, 120
Artist. A New Sixteenth Century, 180
Artist Biographies, 208
Artistic Copyright, 120
Artists. Longevity of, 126
Assault on Labor-Saving Machines, 16
Assay Office, New York. Safety of the, 69, 77
Assisi. Mural Painting at, 141
Association. The Enlisted Labor, 213
Assyria. Rassam's New Explorations in, 152
Assyrian Gates, The, 215
Atlantic Ocean. Boat on, 217
Autographic Telegraphy, 128
Awards at the Paris Exhibition, 200

Basilicas. Decay of the Ruins at, 80
Babylon. Destroying all Traces of, 68
Babylonian Survey, 80
Balloon. A Voiler, 152
Bailey. The Old, 120
Baltimore: —
Inspector of Plumbing, 152, 178
Warehouse Floor. Fall of a, 60
Wells. Condition of, 70
Barataria Ship Canal. The, 104
Bardi's Method of Protecting Iron, 37
Barry, President, Address to R. I. B. A., 193
Bartholdi's Statue of Liberty, 77
Baths in London. Sea Water, 52
Bath Tubs, 89
Bavaria: —
Cremation in, 200
Hydraulic Salt Mining in, 136
Beach Sand causes the Fall of a Floor, 96
Beaux-Arts at Paris. L'Ecole des, 119
Beckett, Sir Edmund: —
And Mr. Street, 202
And the Restoration of St. Alban's, 200
Bells of St. Paul's. The, 144
Bennington Monument. Mr. Meade's Design for the, 26
Berlin: —
Ravenous Mistakes at, 192
The Bauwche Schule, 24
Beseeching a Cement Quarry, 98
Bee. Acoustic Gallery at, 168
Bill. Mr. Schleicher's Public Building, 1
Biographies, Artist, 208
Blackboard Paint, 80
Black Mortar, 93, 120
Blue Copying Process, 44
Board of Health: —
Report. The Massachusetts,
The Illinois, 89
Board of Works, The, and Mr. Lee, 194
Boiler Explosion: —
On the Adelphi, 121
The Cambridge, 142
Boilers and Water Fronts, 178
Books. Modern Illustrated, 175
Boston: —
Chapter A. I. A. The, 160
Fire Commissioners. Report of the, 62
Letter from, 54, 142, 148, 158
Mechanic's Exhibition. The, 132, 142, 148, 159
Pottery School at the Art Museum, 162
Revere Tablet. The, 120
Sanitary Condition of Boston Houses, 62
School of Drawing and Painting, 120
Women's School for Carving and Model Ing. The, 122
Boulogne: —
A New Harbor for, 89
Light-houses. The, 134
Bourdin. M. Dariand and Le Prix, 83
Bow Church, London, 136
Bower's Process for Producing Magnetic Oxide, 15
Brickmaking by Steam, 62
Bricks. Size of American, 59
Bridge: —
A Concrete, 62
Britannia Bridge Restoration. The, 25, 38
Cubics. The East River, 112
Foundations for, 103
Over the Firth of Forth, 184
Story of an Old, 59
The East River, 17, 70, 88
Waterloo, London, 16
Brighton. The Sewers at, 184
Britannia Bridge. Rusting of the, 26, 38
British: —
Art Schools of, 128
Workmen at Paris, 15
British Architect's Defence of Mr. Godwin, 193
Bronze Statue of Dyhuiz, 104
Brooklyn: —
East River Bridge. The, 17
" " Cables. The, 113
" " Condition of the, 98
" " The Financial Condition of the, 117
" " Work to be stopped on, 70
Mr. Mumford and the Jail Plans, 9
Report of Department of Buildings, 210
Builder. A Contumacious, 190
Building Department: —
Investigation of the N. Y., 45
v. Mr. Tallman, 190
Building: —
Law, 208
Material. Iron as a, 14
World. The, 38
Buildings: —
Smoke-stained. Are London, 71.
The Rating of, 125
Bull found at Olympia. Marble, 102.
Bulwark. A Lava, 152
Burgess's House, London. Mr., 148
Burials at Ancient Rome, 127
Burning Crops in California, 80

California: —
Crop Burning, 80
Farmers and Miners, 62, 80, 98
Mining Debris, 62, 80, 98
Cambridge: —
Failure of Concrete Floors at, 174
The Boiler Explosion, 142
Canal: —
The Barataria Ship, 104

Canal:
Of China. The Grand, 129
The Florida Ship, 128
The Inter-Oceanic, 128
Candy Factory Explosion. The, 52
Cape Hayden. Cathedral, 189
Capitol:—
At Albany. The State, 196
Heating the New York, 112
The Hartford, 174
Carbonic Oxide absorbed by Living Organisms, 104
Carving and Modelling. The Women's School for, at Boston, 122
Cask. The Largest, 8
Cast of Cleopatra's Needle, 80
Castellani Collection. The, 151
Cathedral:
At Cape Hayden, 189
The New York, 77
To Queen Mercedes. Memorial, 96
Cave at Glasgow, Ky. Mammoth, 7, 88
Cement:—
Influence of Light on, 18
Quarry in Rosendale, N. Y. Besieging a, 98
From Sewage, 7
Cenchrea Excavations in Cyprus interfered with. Mr., 185
Centpool Ventilation, 102
Chance in a Competition. Value of a, 153
Chapter A. I. A.:—
The Boston, 190
The Cincinnati, 178
The New York, 127
The Rhode Island. Personal Liabilities of Architects, 169
Château St. Louis, Quebec. The, 88
Chicago:—
Academy of Design, 98
" " Architectural Lectures at, 124
Custom House Frauds, 153, 185, 193
Elevator Accident, 82
Lectures on Architecture, 188
Letter from, 110, 124
Suppressing the Upper Story of the Court House, 146
Theatre Ordinance. The New, 133, 167, 183
Wood Pavements in, 110
China:—
Electrotyping on, 168
The Grand Canal of, 129
Sewage in, 85
Chinese and Japanese Art, 108
" Labor in Algeria, 94
" and Fine Art. The, 112
" Taxing the, 112
Chimney Cowls. Ventilating, 23, 69
" with Dynamite. Destroying a, 24
" Fall of a, 52
Chimneys:—
Fires in, 152
Hints on Building, 173
Smoky, 54
Churches, Restoration of, 202
Cincinnati:—
Chapter A. I. A., 178
German Houses in, 34
Letter from, 57
Schools of Art, 173
The Sewage of, 173
Typographical Union and Socialism, 1
Cinerary Urns. Curious, 168
Cities:—
Sub-Cave in, 105
Thoroughfares in Great, 27
City Fronts. The Narrowness of, 61
Cleaning. The Dangers of Pleasure, 176
Cleopatra's Needle, 38, 152, 158
Cast of, 80
Erection of, 114
The Inscription on, 78
Cleveland. Fall of a Shop at, 151
Climbing Washington Monument, 44
Clock Face. A Luminous, 80
Clock. A Gas, 136
Clocks. Illuminated, 80
Cloister of Old St. Paul's, London, 128
Cockerell. The Late Prof. P., 191
Cohen and the Washington Workingmen, 58
Colbert's Trick. A, 136
Collection. The Castellani, 151
Color Decoration in Italy, 22
Color. Mr. Ruskin on, 67
Coloring Zinc Chemically, 8
Colosseum:—
Roman Drainage of, 216
Theatre, Liverpool. Disaster at the, 120
Commissioners' Fourth Report. The Indiana State House, 87
Communism at Home and Abroad, 45
Competition:—
A Criticism of the Patent Office, 105, 108
A Curious, 183
For the Milwaukee Hospital, 150
Humors of, 95
In Interior Decoration, 7, 19, 50, 80, 98
Premiums in, 30
Programmes, 105
Report on the Patent Office, 75
The Patent Office, 2, 17, 53, 61, 76, 105, 109
The Value of a Chance in a, 128
Competitions:—
Architects', 202
Resolutions of the A. I. A. touching, 189
Concrete:—
Bridge. A, 52
Floors at Cambridge. The Failure of, 174
Conductivity of Heat, 60
Congress:—
Of Architects at Paris. International, 69
At Bristol. Trades Union, 113
French and German Workmen's, 45
At Paris. International Health, 90
Congressional:—
Debates. The Use of, 1
Investigation of the Labor Question, 58, 81
Connecticut. The "Genius of," 90
Construction. Fire-proof, 4
Contracts for the Indiana State House, 160
Contumacious Builder. A, 100
Convention A. I. A. The Annual, 140, 153, 169, 170
Convict Labor. The Stonecutters and, 178
Cooperation. Mr. J. H. Walker on, 97
Copper, Hardening of, 208
Copying Process. The Blue, 44
Copyright:—
Architectural, 21
Commission. Mr. Woolner and the, 129
Law. English, 10
Courteous. The Retort, 100
Court House:—
Chicago. Suppressing the Upper Story of, 146
Commission. Mr. Gay and the Rockford, 18
Cowdon's Plan for Controlling the Mississippi Floods, 41.
Cowls. Ventilating Chimney, 24, 68
Cremation in Bavaria, 200
Crop Burning in California, 80
Curious Epitaph, 80
Custody of an Architect's Drawings, 113
Custom House:—
Frauds. Mr. Hill and the Chicago, 169
And Mr. Walsh. The St. Louis, 81, 140, 168
Cyprus:—
Interfered with. Maj. Di Cesnola. Excavations in, 185
Mediæval Architecture in, 150
Cyrus. The Treasures of, 128

Dangers of Picture Cleaning. The, 176
Darimont and Le Prix Bourdin. M., 68
Delmas. The Tune of Congressional, 1
Decay of Italian Art, 170
Decorative Art:—
At Paris, 97.
Loan Exhibition of the N. Y. Soc. of, 126
Lectures of the N. Y. Soc. of, 122
Decorations:—
Competitions in Interior, 59, 98
Of St. Paul's. The, 104
Delaware Mounds, 16
Delhi. The Peacock Hall, 160
Delphi. Excavating the Temple of, 168
Demuth's Sincerity in the Office of Supervising Architect, 9
Deodorants and Disinfectants, 104
Departments and the Metric System, 71
Design:—
The Chicago Academy of, 98
The Rhode Island School of, to be opened, 82
Detector. A Simple Fire, 68
Deterioration of Oil Paintings, 55
Detroit. Steam Heating in, 144
Dilapidations, 84, 104
Diplomas. M. Duthoit on the Architectural, 88
Disinfectants and Deodorants, 104
Dome of St. Paul's. Decoration of the, 47, 71
Doors. Fire-proof, 44
Dorè's Pictures, 167
Douglas Monument. The, 98
Draining the Colosseum, 216
Drains and Typhoid Fever, 42
Draughtsmen's Association. The St. Louis Architectural, 64
Drawing in French Colleges, 38
Drawings:—
Custody of an Architect's, 113.
Mr. Ruskin's, 167
Of the Old Masters, 200
Ownership of, 151, 120, 135
Value of Architectural, 153
Dresden Theatre. The, 69
Durability of Pine Shingles, 80
Dutch and English Paintings, 180
Dust on the Atlantic, 216
Dwellings of the Poor, 102
Dyhuts, 104
Dynamite:—
Destroying a Chimney with, 24
The Effect of, 68
Dyrenfurth's Plan for a National Polytechnic School. Dr., 9

Earthquakes. Japanese, 90
East River Bridge, The, 17
" " " Cables, 112
Echoes. Aerial, 126
Ecole des Beaux Arts, 119
Education. English, French, and German Art, 89
Electric:—
Lamp. An, 68
Light, 104
" In a French Factory, 8
" And Photography, 16
Electrotyping on China, 168
Elevated Railway:—
The Grand Jury and the New York, 121
Noise of the New York, 7, 112
Opposition to the New York, 106
Paxton's, 24
Elevated Railways, 174
And Street Architecture, 15
Elevator Accident:—
At Chicago, 82
At Stewart's Store, N. Y., 120
Elevator Accidents:—
In New York and Chicago, 154
Responsibility for, 153
Elgin, Ill. Fall of a Wall at, 61
Elgin Marbles. The Perishing of the, 129
Elmira. The N. Y. State Reformatory at, 183
Embankments. Willows and Railroad, 138
Emigration en Masse, 60
English:—
And French Architecture, 153
Copyright Law, 10
Cost of Production, French and, 128
Education in Art, 89
Enrolling at the Paris Exhibition, 198
National Water-supply, 13
Painting. Dutch and, 180
Vandalism, 152
Water-color Painting. French Criticism on, 186
Engineering:—
Baratoria Ship Canal. The, 104
Boulogne. New Harbor for, 88
Boulogne Light-house. The, 184
Bridge over the Firth of Forth, 184
Brooklyn Bridge, 17, 70
Canal of China. The Grand, 129
Captain Cowdon's Plan for Controlling the Mississippi Floods, 46
Equilibration of Arches. The, 122
Florida Ship Canal. The, 128
Foundations for Bridges, 108
Gibraltar Tunnel. The, 186
Hudson River Tunnel. The, 35, 68
Hydraulic Salt Mining in Bavaria, 136
Inter-Oceanic Canal, 128
Iron from Fire and Rust. Protecting, 88
Niagara Falls. Motive Power of, 8
Quebec Harbor. Clearing, 88
Railroad across Sahara, 200
" up Vesuvius, 122
Railroads of Peru. The, 86
Raising of the Britannia Bridge. The, 36
Spinola's Steam-heating Scheme, 108, 133
St. Gothard Tunnel, 60, 144
Sutro Tunnel. The, 8, 16, 88
Tunnelling. Accurate, 176
Water-jet in Excavation. The, 60
Waterloo Bridge, London, 16
Willows and Railroad Embankments, 136
Eddystone Lighthouse. Decay of the, 47
Paul Jeulin. Report on the, 180
Concrete Bridge. A, 52
And Architects, 50, 62, 89
For Louisiana. Board of Consulting, 192
Engines. Powerful, 8
Enlisted Labor Association. The, 118
Entablature. A Long, 68
Epitaph. A Curious, 60
Equestrian Statue found in the Tiber, 168
Equilibration of Arches. The, 122
Eros of Praxiteles. The, 36
Esquiline. The, 64
Etchings. Turner's, 150
Eucalyptus. Trees of the Genus, 184
European Forests, 80
" Schools of Forestry, 19
Exhibition:—
At Milan. International, 23
At Paris. The Workingmen's, 183
Boston. The Mechanic's, 102, 142, 148, 150
Buildings. The Paris, 57, 65
Close of the Paris, 170
English Furniture at the Paris, 198
Monopoly at the French, 198
Of the N. Y. Soc. Decorative Art. Loan, 126
Of Turner's Water Colors, 85
Excavation. The Water-jet in, 60
Exeter Cross. Olympian, 68
Explorers vs. Archæologists, 129
Explosion:—
On the Adelphi Hotel, 121
The Candy Factory, 52
Of Marine Torpedoes. Sympathetic, 172
Explosiveness of Flour Dust, 52
Exposition, French, Glance at the Architecture of, 204
Express Co. Delaying to Deliver Competitive Drawings, 153.

Fans. Venty's Ventilating, 104.
Fahrenheit Pack, Improvements in, 216
Farmers and Hydraulic Mining. California, 62, 90, 97
Fencing. The Cost of, 8
Fertilizer. Value of Sewage as a, 200
Fever:—
Prairie and Typhoid, 42
At Grenada. Yellow, 70
Fifty-third St., N. Y. Fall of House in, 86
Filters, 38
Fire Commissioners' Report. The Boston, 62
Fire Detector. A Simple, 68
Fire-places. The Open, 116, 132, 146, 187
Fire-proof:—
Construction, 4
Doors, 44
Floor. New, 8
Fires in Chimneys, 152
" Theatres, 82
Firth of Forth. Bridge over the, 184.
Flame, Opacity of, 216
Flaxman's Outlines, 183
Floor:—
Fall of a Stable, 160
New Fire-proof, 8
Floors at Cambridge. Failure of Concrete, 174
Florence in the Fourteenth Century, 186
Florida Ship Canal. The, 128
Flour Dust. The Explosiveness of, 52
Forestry in Europe. Schools of, 19
Forests:—
European, 80
In the United States, 19
Forty-second Street Tunnel, N. Y. Fall of, 1, 26, 145
Foundation for Bridges, 108
France. Accidents from Machinery in, 164
Frankfort-on-the-Main. Bridge at, 58
Frauds:—
Mr. Walsh and the St. Louis Custom House, 61
In Paris, Discovery of, 216
Pretoria. Natural Gas at, 104
French, 207
French:—
And English Cost of Production, 128
Art Schools, 80
Colleges. Drawing in, 36
Criticism of English Water-color Painting, 186
Exhibition. Close of the, 170
" English Furniture at, 198
Government Buys Pictures. How the, 175
Miners, 176
Painting of To-day, 126
Workingmen's Congress, 4
Frieze. The Panathenaic, 28
Fulton. Statue of Robert, 168
Furniture:—
At the Paris Exhibition, English, 198
" " " French, 207
Future. The Light of the, 164

Gale at Philadelphia. Effects of a, 145
Gallery at Nar. Acoustic, 168
Gas:—
Clock. A, 136
In Pretoria, N. Y. Natural, 104
Heating, 96
Lighting. Injuries by, 126
Gases. Parliamentary Report on Noxious, 114
Gasoline as a Disinfectant, 104
Gates, The Assyrian, 215
Gay and the Rockford Court-house Commission. Mr., 18
German Art Schools, 88, 94
German House in Cincinnati, 34
German Workmen's Congress, 45
Geometrical Drawing, Value of, 213
Gewerbe Schule, Berlin, 34
Giant's Grave at Malaga, 24
Gibraltar Tunnel, 186
Girard Bequest and Wooden Buildings, 70
Glasgow, Ky. Mammoth Cave at, 7, 88
Gobelins Tapestry at the Paris Exhibition, 36
Godwin (Mr.), *British Architects* on, 198
Government Departments and the Metric System, 71
Granite vs. Sandstone, 80
Grant. Death of Sir Francis, 146, 157, 158
Graves at Malaga. Giant's, 24
Gravestones. What becomes of the, 8
Graveyard Abuses, 80
Greek Ornaments, 183
Grenada, Miss. Yellow Fever at, 70
Grimani of Aliseah. The, 67

Harbor:—
For Boulogne. A New, 88
Clearing Quebec, 88
Hague. Spinola's House at The, 112.
Harmony in Yellow and Gold. Mr. Whistler's, 96
Hartford:—
Capitol. The, 174
" Accident at the, 132
Letter from, 66, 174
Orphan Asylums, 174
Trinity College, 112
Water Supply of, 200
Hayden. Cathedral at Cape, 189
Health:—
Congress at Paris, 90
Report of the Mass. Board of, 98
Heat. Conductivity of, 60
Heated Iron. Optical Illusion Caused by, 120
Heating:—
Gas, 96
The New York Capitol, 112
Heidelberg. Roman Remains at, 191
Herculaneum and Pompeii, 52
Hevner. Pennsylvania's, 80, 168
Hewitt's Congressional Labor Committee, 58, 81
Hill, Mr.:—
And the Chicago Custom House, 169
Indicted for Frauds, 185
Supervising Architect, suspended, 133
Hints:—
On Building Chimneys, 173
Plumbing, 178
Holbrook, Mass., Church Competition. The, 96
Horton House at Southold, 152
Hummel's, Miss:—
Artificial Marble, 32
Inventions, 162
Pompeian Sanitas, 68
Hôtel de Ville, Paris, 88
Hot Water System, 178
House:—
In America. Oldest, 152
Plans for Everybody, 101
The Old, altered, 212
Houses in Paris. Numbering, 180
Hudson River Tunnel. The, 35, 68
Humors of Competition, 95
Hunt, Mr.:—
Decoration of N. Y. State Capitol, 196
Paintings at the Albany Capitol, 177
Hydraulic:—
Mining. California Furnace and, 62, 90
Salt Mining in Bavaria, 136

Illinois:—
Board of Health. The, 88
Industrial Universities. Catalogue of, 82
State House Commissioners. Extravagance of the, 18
The Capitol, 217
Illuminated Clocks, 80
Illustrated Books. Modern, 176
Immergut. Michael Angelo, 160
Indelible. Making Pencil Marks, 152
Indian Mound at Fort Leavenworth
Indiana:—
Board of Consulting Architects, 192
Hospital for the Insane, 7

Indiana:—
State House Commissioners' Fourth Report, 37
" Contracts, 101
" Suits. The, 137
Indicted for Frauds in the Chicago Custom House. Mr. Hill and others, 156
Industrial University. Master Builder's Course of the Illinois, 82
Ingenuity. American, 111
Insane. Indiana Hospital for the, 7
Inscription on Cleopatra's Needle. The, 78
Inspector of Plumbing for Baltimore, 178
Institute:—
Convention, 169, 170
Institute of Technology gains a Medal at Paris, 92
Printing the Proceedings of the, 139
Interchange. The Art, 107
Interior Decoration. Competition in, 7, 10, 50, 83, 93
International:—
Congress of Architects at Paris, 30
Park at Niagara. Proposed, 123
Inter-Oceanic Canal, 128
Inundation from the Nile, 188
Irish:—
Architecture, 68
Monument. An, 67
Iron:—
As a Building Material, 14
Free in Nature, 210
From Fire. Protecting, 38
Optical Illusion caused by Heated, 120
Spiegel, 144
The Oldest Specimens, 176
Window Sashes, 112
Italian Art. The Decay of, 176
Italy:—
Color Decoration in, 22
Cremation in, 200
Sepulchral Monuments of, 192
Idiacs. Dr. Schliemann's Discoveries at, 128, 144, 167

Jail Plans. Mr. Mundell and the Brooklyn, 9
Japanese and Chinese Art, 168
Jasmine:—
Earthquakes, 80
Statue of Dphnis, 104
Jarves's Remarks on the Bennington, Vt., Monument, 26
Jefferson. Monument to Thomas, 80
Jersey City:—
Cemetery Abuses, 80
Strike. The, 80
Jerusalem. Temple of Herod at, 117
Jetties. The Mississippi, 130
Jury, Grand, and the N. Y. Elevated Railway, 121

Kamehameha. Statue of, 168
Kearney coming East, 37
Kerosene Reservoirs, 120
Kiel:—
Statue at, 152
Statues for the University of, 16
Klaus Memorial, 112

Labor:—
Association. The Enlisted, 113
Committee. Mr. Walker's Testimony before the Congressional, 97
Question. Congressional Investigation of the, 53, 94, 97
Saving Machines. Assault on, 16
Statistics. Massachusetts Bureau of, 81
The Stone Cutters and Convict, 179
Troubles, 210
Lacustrine Relics, 168
LaFarge's Pictures. Mr., 182
Lakes. Depth of, 152
Lamp:—
An Electric, 68
A Submarine, 60
Land. Cheap, 16
Lava Bulwark, 152
Law Courts, London. The New, 158
Lead:—
Poisoning. Prevention of, 144
Roofs. Durability of, 16
Leavenworth. Indian Mound at Fort, 186
Lee:—
And the Board of Works. Mr., 104
Monument. The Filling around the, 161
Legal:—
Architect's Lien on a Building, 81
" Risks, 186, 194
Case before a South Carolina Court, 134
Custody of an Architect's Drawings. The, 148
English Copyright Law, 10
Express Company delaying to deliver Competitive Drawings, 163
Gay, Mr., and Rockford Court House Competitions, 18
Indiana State House Suits. The, 137
Lee vs. The Board of Works. Mr., 104
Ownership of Drawings. The, 101
Responsibilities of Architects. 130, 191
Tallman and the Building Department. Mr., 134, 190
Tenement. What is a, 48
Value of a Chance in a Competition. The, 153
Verdict on Fall of Elevator at Grand Hotel, Paris, 25
Verdict on the Fall of 42d St. Tunnel, New York, 18
Whistler vs. Ruskin, 180, 194
Leighton, Mr., elected President of the R. A., 140
Leonardo da Vinci. Drawings of, 200
Letter:—
From Boston, 51
From Chicago, 124
From Hartford, 66, 174
From London, 55, 107, 126, 148, 168
Letter:—
From New York, 15, 32, 77, 148
From Paris, 52, 135, 207
From Rome, 12
From St. John, 111, 124
From St. Louis, 101
Liberty. Bartholdi's Statue of, 77
Lichen, or Smoke stain, 71
Lien on a Building. Architect's, 81
Light:—
Electric. The, 194
Of the Future, 184
On Cement. Influence of, 16
Lighthouses:—
Education. Decay of the, 47
From an Inferior Light. Making a First-class, 193
Lighthouses. The Boulogne, 134
Lightning-rod. A Dangerous, 35
Lightning-rods, 28
" Naval, 68
Limestone Pavement, 35
Liverpool. Disaster at the Colosseum Theatre, 139
Loan Exhibition of the New York Society Decorative Art, 136, 181
London:—
Bailey. The Old, 120
Bow Church, 135
Burges's House. Mr., 118
Church of All Saints. Who shall repair the, 85
Cleopatra's Needle, 38, 158
" " Final Erection of, 114
Houses in London and Paris, 112
Law Courts. The New, 158
Letter from, 55, 107, 126, 148, 168
Mr. Leighton and the Royal Academy, 170
Natural History Museum. The, 123
Opera House. The National, 141
Outfall Sewers. The, 181
Queen Ann Work, 148
Roman Remains. Discovery of, 106
St. Paul's. Cloister of Old, 128
" Decoration of, 104
" Decoration of the Dome of, 46, 72
The Bells of, 144
Seawater Baths in, 38
Squatty Appearance of London Buildings, 72
Strike of the Police. Threatened, 88
Waterloo Bridge, 16
Longevity of Artists, 126
Lorenzo. Vandals in the, 152
Luminous Clock Face. A, 80
Lynchburg, Va. Panic in a Church, 144

Machinery in France. Accidents from, 104
Magnetic:—
Motor. Miss Hosmer's, 182
Oxide, 16
Malaga. Chant's Grave at, 24
Mammoth Cave at Glasgow, Ky., 7, 26
Manchester:—
Architects. Mr. Waterhouse's Address to, 97
Joiners' Strike. The, 68
Town Hall, 80
Marble. Miss Hosmer's Artificial, 88
Marbles. Painting of the Elgin, 128
Mason, George C. The Old House altered, 213
Massachusetts Bureau of Labor Statistics, 81
Master Builders' Course at Illinois Industrial University, 82
Mendel's Design for the Bennington Monument. Mr., 26
Mechanic's Exhibition, Boston. The, 132, 142, 148, 159
Medal to the Institute of Technology, 82
Memorial:—
Institute. The Knox, 112
The Sir Gilbert Scott, 2, 52
Merrator. Monument of, 152
Mercedes. Memorial Cathedral to Queen, 96
Metric System:—
Adopted by the International Congress on Weights and Coins, 96
And the Government Departments, 71
Michelet's Tomb, 3
Milan. International Exhibition in, 23
Milwaukee Hospital Competition, 160
Miners:—
And Farmers in California, 62, 80, 98
French, 176
Mines. Tin, 88
Mining:—
California Farmers and Hydraulic, 62, 90, 93
In Bavaria. Hydraulic Salt, 126
Missionary Work. Architectural, 68
Mississippi:—
Florida. The, 45
Jetties. The, 130
Modern:—
Illustrated Books, 176
Plumbing, 19, 38, 73, 90, 140, 178
Monastery. A Trappist, 88
Monographs. New Architectural, 102
Monreale, 20
Monuments:—
An Irish, 67
Climbing Washington, 44
Of William III. of Prussia, 152
The Bennington, and Mr. Jarves, 26
The Dunging, 98
The Washington, 25, 54, 120, 161, 201
To Mercator, 152
To M. Henri Regnault, 21
To Thomas Jefferson, 80
To Victor Emanuel, 3
Moran, Mr. Thomas. Discovery of a new Painting by Turner, 200
Morocco at the French Exhibition, 128
Morsels. A Curious Placard at, 60
Mortar. Black, 96, 120
Mosaics at Berlin. Revenge, 102
Motor. Miss Hosmer's Magnetic, 182
Mott Street Accident. Coroner's Verdict on the, 2
Mound at Fort Leavenworth. Indian, 186
Mounds. Delaware, 12
Muhlenburg. Statue of Gen. Peter, 168
Mummies. New Theory regarding, 7
Mundel and the Brooklyn Jail Plans. Mr., 9
Mural Painting at Amiel, 141
Museum, London. The Natural History, 123
Myers vs. Indiana State House Commission, 137

Narrowness of City Fronts. The, 51
Nave of St. Alban's. The, 108
Needle. Cleopatra's, 38
Nevada. Mining Accident in, 51
Newcastle Abbey. Discoveries at, 96
New Bedford. Church at, 96
Newcastle employing an Engineer to Plans of an Architect, 89
New Haven revisited, 155
New Orleans:—
Filth, 151
Yellow Fever in, 129
New York:—
Architecture at the College of New York, 17
Assay Office. Safety of the, 60, 77
Association for Improving the Condition of the Poor. Report of, 177
Blowing open a Water-main, 26
Building Department. Investigation of the, 45
Candy Factory Explosion. The, 52
Cathedral. Work at the, 77
Chapter A. I. A. The New York, 127
Convention A. I. A. Annual, 142, 153
Coroner's Verdict on the Mott Street Accident, 2
Elevated Railway. And Street Architecture. The, 15
" " Noise of, 7
" " Opposition to the, 106
" " The Grand Jury and, 121
Elevator Accident at Stewart's Store, 190
Fall of a Building, 128
Fall of a House on 63d St., 36
Government Treasure Vaults, 16
Letter from, 15, 32, 77, 148
Loan Exhibition of the Society of Decorative Art, 136, 181
Pavements, 120
Reformatory at Elmira, 183
Society of Decorative Art's Lectures. The, 122
Spinola's Steam-heating Scheme, 26, 54, 105
Steam-heating Scheme. Mayor Ely rejects, 154
State Capitol, 153
State House. Heating the, 102
" " Mr. Hunt's Paintings at the, 177
Tenement Houses in New York, 178
Tompkins Square, 128
Trenches in the Streets, 128
Tunnel. Fall of 42d St., 1, 25, 145
" Second Fall of the 42d St., 129
Underground Telegraph Wires, 210
Niagara Falls. Motive Power of, 8
" Proposed International Park at, 128
Niello, 88
Nile. Inundations from the, 188
Nomenclature of Mr. Whistler's Pictures, 199
Norton's Articles on St. Mary of the Flower, 188
Notre Dame, Paris. Loss of the Weathercock of, 102
Nucleus Guard. Parliamentary Report on, 114
Numbering Houses in Paris, 100

Obelisk. Casts of the English, 80
Erection of the, 114
The Inscription on the, 78
Wind Pressure and the, 226
Obituary:—
Death of Sir Francis Grant, 146, 157, 168
Mr. Fred P. Cockerell, 191
Mr. Richard Upjohn, 81, 82
Observatory on Mount Etna, 109
Oil Paintings. Deterioration of, 65
Old Bailey. The, 120
Old Colony R. R. Accident, 190
Old Masters. Drawings of, 200
Olympian Excavations, 69
Open Fire-Place. The, 116, 131, 146, 187
Opera-House. The London, 44
Optical Illusion, caused by Heated Iron, 120
Ordinance. The Chicago Theatre, 133, 137
Organization. Architects and, 151
Ornaments. Greek, 133
Ortell. Sinking of Earth at, 141
Outlines. Flaxman's, 188
Ownership of Drawings. The, 120, 135, 191
Oxide. Mr. Bowers' Process for producing Magnetic, 16.

Paint. Blackboard, 80
Painting:—
At Amiel. Mural, 141
Of To-day. French, 125
Paintings:—
At the Albany Capitol. Mr. Hunt's, 177
Deterioration of Oil, 65
Paints and Wall Papers. Poisonous, 192
Palace. King Alfred's, 200
Palermitan Architecture, 2
Palestine. Architecture in, 117
Panathenaic Frieze, 48
Panic:—
At Berlin, 184
Panics, 144
Pantheon at Rome flooded. The, 200
Paper. Various Uses of, 164
Paris:—
American Awards. The, 144
Art Awards at the Exhibition. The, 200
British Workmen may see at Paris. What, 15.
Discovery of a Tower, 216
English Furniture at the Exhibition, 199
Exhibition Buildings. The, 57, 65
Exhibition. Close of the, 170
Façades in the Street of the Nations, 65
Gobelins Tapestry at the Exhibition, 30
Hôtel de Ville. The, 88
Houses in London and, 112
International Congress of Architects, 68
" Health Congress, 80
L'Ecole des Beaux-Arts, 119
Letter from, 52, 135, 205
Morocco at the Exhibition, 128
Numbering Houses, 100
Palace of the Trocadéro. The, 32
Sewage System of. The, 41, 65
Society of Decorative Art, 97
Tour Jean sans Peur, 60
Verdict on Fall of Elevator at Grand Hotel, 25
Weathercock of Notre Dame. Loss of the, 192
Workingmen's Exhibition. The, 138
Patent Office Competition:—
A Criticism of the, 61, 105, 139
Report on the, 75
The, 2, 17, 53, 61
Patents for 1877–8, 160
Pavement. Limestone, 35
Pavements:—
In Chicago. Wood, 110
In New York, 220
Paxton's Elevated Railway, 24
Peacock Hall. Delhi. The, 160
Pencil Marks Indelible. Making, 152
Pennsylvania Heroes, 80, 108
Perspective. Papers on, 47, 71, 99
Peru. The Railroads of, 35
Philadelphia:—
Effects of a Gale at, 146
House Drainage in, 213
Proposed Elevated Railway in, 176
Stephen Girard's Will touching Wooden Buildings, 70
Photographs. Architectural, 192
Photography and the Electric Light, 16
Piazza. Fall of a, 52
Picture Cleaning. The Dangers of, 176
Pictures:—
How the French Government buys, 175
Mr. LaFarge's, 182
The Nomenclature of Mr. Whistler's, 199
Pine Shingles. Durability of, 80
Planting Trees, 108
Plaster of Paris, 160
Plumbing:—
For Baltimore, Inspector of, 152, 178
Hints, 26, 176
Modern, 19, 38, 73, 90, 140, 178
Poisoning. Prevention of Lead, 144
Poisonous Paints and Wall Papers, 192
Polar Balloon. A, 152
Police. Threatened Strike of the London, 88
Politics in the Department of Architecture, 9
Polytechnic School. Plan for a National, 9
Pompeian Play-Bill. A Modern, 88
Pompeian Seating. The, 68
Pompeii and Herculaneum, 52
Poor:—
Dwellings of the, 103
Report of the N. Y. Association for Improving the Condition of the Poor, 177
Porta Nigra at Treves, 184
Potter, Mr., Indicted for Fraud, 185
Pottery School at the Boston Art Museum, 162
Praxiteles. The Eros of, 96
Premiums in Competition, 10
Preserving Timber, 112
Princess Alice Disaster and the London Bounds, 101
Printing the Proceedings of the Institute, 190
Prism Jars, 8
Prix Bordin. Le, 68
Prizes offered to Workmen, 122
Proceedings of the Institute. Printing the, 139
Programmes. Competition, 105
Protection of Ancient Buildings. Report of the Society for the, 37
Providence City Hall. Decoration of, 43
Public:—
Buildings. Appropriations for, 1
Works in Indiana, 122
Pure Air, 123
Pyronomics. A Question in, 16

Quarry in Rosendale, N. Y. Besieging a Cement, 96
Queen Anne Work in London, 148
Quebec Harbor. Clearing, 83
Quebec Improvements. The, 88

Radiator. Steam as a Reflector and, 184
Railroad:—
Across Sahara, 200
Iron. Manufacture of, 128
Of Peru. The, 35
Strike. Non-fulfilment of the, 57
Up Vesuvius, 120
Railway:—
Noise of the Elevated, 112
Opposition to the N. Y. Elevated, 106
Paxton's Elevated, 24
Railways. Safety of, 152

Rassam's Explorations in Assyria, 162
Rating of Buildings. The, 125
Ravenuto Mosaics at Berlin, 122
Referee. Architectural, 208
Reynaud. Monument to M. Henri, 21
Reisiger's Illuminated Clock, 9
Report:—
Of the Boston Fire Commissioners, 62
" " School of Drawing and Painting, 120
Of the Mass. Board of Health, 93
Of the N. Y. Association for Improving the Condition of the Poor, 177
Of the Society for the Protection of Ancient Buildings, 37
Of the Supervising Architect, 169, 177
On Noxious Gases. Parliamentary, 114
On the Patent Office Competition, 76
Representation. Taxation without, 139
Reservoirs. Kerosene, 120
Responsibilities of Architects. The Legal, 150, 164
Responsibility for Building Disasters, 20
Restoration:—
Movement. The Anti-, 40
Of Churches, 202
" " The Window Tax and, 68
Of St. Alban's, 206
Retort Contrivance. The, 109
Rivers Tablet. The, 120
Review:—
Art Interchange. The, 107
Building World. The, 38
Cambridge Water Exposition. The, 162
Flaxman's Outlines. 188
Greek Ornaments. 188
House Plans for Everybody, 101
Ninth Report of the Mass. Board of Health, 93
Technology. *Per*, 162
Turner's Etchings, 150
Rhode Island:—
Charter, and Personal Liability, 169
School of Design to be Opened, 82
Risks. Architects', 138, 154
Rockford Court House Commission and Mr. Gay, 18
Roman London, 106
Remains at Heidelberg, 191
" at Weisbruck, 120
Rome:—
Burials at Aminat, 127
Draining the Coliseum, 218
Equestrian Statue found in the Tiber, 108
Excavations at, 141
Flooding of the Pantheon, 200
Letter from, 22
Mr. Street's American Episcopal Church, 124
Statue of Valentinianus I. Discovery of the, 136
Via Sacra. Uncovering the, 192
Roofs. Durability of Lead, 16
Rosendale Cement Quarry. Enlarging a, 96
Royal Academy. Mr. Leighton Elected President of the, 170
Royal Inst. of British Architects. Mr. Barry's Address, 102
Ruskin:—
On Color. Mr., 97
vs. Walshire, 196, 194
Ruskin's Drawings. Mr., 107
" Opening of Turner, 86
Rust and Prof. Barff's Process. Iron, 38

Safety of Railways, 152
Sahara, Railroad across, 200
" Flooding of, 216
Salt Mine in New York, 8
" Mining in Bavaria. Hydraulic, 138
Sand-stone the Fall of a Floor, 96
Sandstone vs. Granite, 50
San Francisco Undertaker's Tower. A, 87
Sanitary:—
Baltimore Wells. Condition of, 79
Boston Houses. Sanitary Condition of, 8, 52
Cement from Sewage. Making, 7
Cesspool Ventilation, 102
Disinfectants and Deodorants, 104
Drains and Typhoid Fever, 43
English National Water Supply, 17
Hartford Water Supply. The, 200
Illinois Board of Health. The, 88
International Health Congress at Paris, 90
London Outfall Sewers. The, 101
Modern Plumbing, 10, 48, 73, 90, 140
Plumbing Hints, 36
Pure Air in San Francisco, 112
Sanitary " Science." The, 180
Sewage in China, 80
" of Cincinnati, 153
" System of Paris, 41, 50
Sewer Ventilation. Questions in, 79
Sewers of Brighton. The, 164
Street Sprinkling, 36
Ventilation of Sewers and Drains, 76
Yellow Fever in the South. The, 70
Scaffold Accidents, 68
"Scare." The Sanitary, 180
Schliemann's Public Building Bill. Mr., 1
Schliemann at Ithaca. Dr., 128, 144, 167
School:—
At the Boston Art Museum. The Pottery, 142.
Buildings. Ventilation and Heating of, 5
For Carving and Modelling. The Women, 132
Of Design to be Opened. The Rhode Island, 82
Of Drawing and Painting, Boston, 120
Plan for a National Polytechnic, 0
Schools:—
Of Art. British, 239
" Cincinnati, 152
Of Forestry in Europe, 19
Scott Memorial. The Sir Gilbert, 2, 62
Sculptors in Italy. American, 22
Seaside Architecture. English and French, 165
Sea-water Baths in London, 68
Sepulchral Monuments in Italy, 192
Sewage:—
As a Fertilizer, 200
In Chico, 83
Making Cement from, 7
Of Cincinnati, 153
System of Paris. The, 41, 50
Sewer Ventilation. Questions in, 79
Sewerage of Washington, 216
Sewers:—
And Drains. Ventilation of, 78
At Brighton. The, 164
The Princess Alice and the London, 161
Shingles. Durability of Pine, 80
Ships' Steel in, 216
Sinks:—
Kitchen, 140
Pantry, 48
Slop, 140
Size of American Bricks, 59
Slop Sinks, 140
Smoke. Are London Buildings stained by, 71
Smoky Chimneys, 58
Socialism. The Cincinnati Typographical Union and, 1
South Carolina Court. Case before a, 196
Spiegel Iron, 144
Spinola Steam Heating Scheme, 105, 139
Spinoza's House at the Hague, 112
Springfield, Ill. The Capitol at, 18
St. Alban's Nave, 199
St. Gothard Tunnel, 60
" " " Contract for the, 144
St. John. Letter from, 111, 154
" Trinity Church, 42
St. Louis:—
Architectural Draughtsmen's Association, 54
Custom House Investigation. The, 61, 146, 196
Letter from, 101
St. Paul's. The Bells of, 141
" The Decorations of, 45, 71, 104
Stable Floor. Fall of a, 160
State House:—
At Albany. The, 87, 196
Commissioner's Fourth Report. The Indiana, 37
Contracts. The Indiana, 161
Illinois State House Commissioners. The, 18
Suits. The Indiana, 137
Statues:—
Bronze, 120
Found in the Tiber. Equestrian, 108
Genius of Connecticut. The, 90
Of Gen. Peter Muhlenberg, 168
Of Kamehameha, 168
Of Liberty. Bartholdi's, 77
Of Robert Dutton, 168
Of Valentinianus, 136
Pompeian Sentinel. The, 69
Stearns:—
For the Hartford Capitol, 68
For the University of Kiel, 16
Steam:—
As a Reflector and Radiator of Light, 184
Boilers. The Explosion of, 162
Brickmaking by, 52
Steam-Heating:—
And its Effect on Trees, 64
In Detroit, 144
In New York varied by the Mayor, 154
Scheme for New York. Spinola's, 26, 105, 139
Steel Bridges, 8
Steel in Ships, 216
Steeple-Jack's Seat. A, 44
Stone. Artificial, 120
Stone-Cutters and Council Labor. The, 176
Story of an Old Bridge, 69
Strasburg. Roman Antiquities at, 176
Street:—
Filling in New Orleans, 181
Sprinkling, 86
Street, Mr., and Sir Edmund Beckett, 202
Streets. Trenches in New York, 138
Strength. Tests of, 184
Strike:—
Of Carpenters in New York, 210
Of the London Police. Threatened, 83
Non-fulfilment of the Railroad, 27.
The Jersey City, 80
" Manchester Joiners', 68
Studies:—
Art, 179
Of an Architect. The, 70
Stuyvesant Russell, Professor of Architecture at the College of New York, 17, 83
Submarine Lamp. A, 60
Subterranean Work at Welbeck, 84
Sub-ways in Cities, 105
Sulphide of Carbon and Chimney Fires. 152
Supervising Architect:—
And the Chicago Custom-House, 189.
Indicted for Fraud, 185
Report of the, 169, 177
Suspension of, 198
Supervising Architect's Position. Difficulties of the, 82
Surveys, National, Report of the Committee on, 214
Suspension of Mr. Hill from Office, 180
Suttro Tunnel:—
Effect of the, 58
The, 8, 16, 24

Tablet. The Revere, 129
Talmage, Mr., and the Building Department, 194, 200
Tapestry at the Paris Exhibition. Gobelins, 88
Tax on the Chinese. Import, 112
Taxation without Representation, 198
Technology. *Per*, 162
Technology gains a Medal. The Architectural Students of the Institute of, 22
Telegraph Wires. Underground, 144
Telegraphy. Autographic, 168
Telephone. Insurance of the, 104
Temple:—
At Jagernath, 117
Of Delphi. Excavating the, 168
Tenement:—
Demolition of, 96
Houses, Competition for, 208
" in New York, 176
Terrestrial Balance. A, 144
Tests for Laymen. Water, 7
Thames Conservators and the Metropolitan Board of Works, 161
Theatre:—
Disaster. The Colosseum, 120
" The Dresden, 60
Ordinance. The New Chicago, 123, 137, 142
Theatres. Fires in, 35
Theological Institute. The Connecticut, 66
Thoroughfares in Great Cities, 27
Tiber. Equestrian Statue found in the, 108
Timber. Preserving, 112
Times (London) on Mr. Barry's Address, The, 193
Tin Mines, 36
Tomb. Nicholet's, 8
Tompkins Square, New York, 128
Torlonia's Palace and the Via Nazionale. Prince, 96
Torpedoes. Sympathetic Explosion of Marine, 162
Tour Jean sans Peur, Paris, 80
Tower of a San Francisco Undertaker, 67
" in Paris. Discovery of, 216.
Town Hall. Manchester, 81
Trades Union Congress at Bristol, 112
Trappist Monastery, 89
Trees:—
Affected by Steam Heating, 64
Of the Genus Eucalyptus, 184
Planting, 108
Trenches in New York Streets, 128
Treves (Trier). The Porta Nigra at, 136
Trinity:—
Church, St. John, N. B. 42
College, Hartford, 112
Trocadero, Paris. The Palace of the, 82
Tunnel:—
Contract for the St. Gothard, 144.
Effect of the Suttro, 86
New York. Fall of the Forty-second Street, 1, 25, 145
" " Second Fall of the Forty-second Street, 188
" " Verdict on Fall of the Forty-second Street, 18
The Gibraltar, 136
" Hudson River, 85, 88
" St. Gothard, 60
" Suttro, 8, 16, 24
Tunnelling. Accurate, 176
Turner:—
A new Painting, 209
Etchings, 150
Water Colors Exhibited, 85
Turpentine as a Deodorant, 104
Typhoid Fever. Drains and, 43
Typographical Union and Socialism. The Cincinnati, 1

Ueshaw Steel Bronze Gun, 6
Underground Telegraph Wires, 144
United States. Architecture in the, 19
Upjohn. Death of Richard, 61, 82

Valentinianus I. Statue of, 136
Value of Architectural Drawings, 152
Vandalism. English, 152
Varnishing. Hints on, 104
Vatican. Halls in the, 49
Vault in Forty-Second St., N. Y. Fall of, 1, 25
Vaults in New York. Government Treasure, 16
Ventilating:—
Chimney Cowls, 24, 38
Flues. Verity's, 104
Ventilation:—
And Heating of School Buildings, 5
Cesspool, 102
Of Sewers and Drains, 76
Questions in Sewer, 79
Verdict:—
On Fall of Elevator at Grand Hotel, Paris, 25
On Fall of Forty-Second St. Tunnel, N. Y., 18
On the Mott St., N. Y., Accident, 2
Verity's Ventilating Flues, 104
Vernacular Architecture:—
Archæology and the, 143
American, 5
Vesuvius. Proposed Railroad up, 122
Vote of the N. Y. Steam-Heating Scheme, 154
Victor Emanuel. Monument to, 8
Vigo County Court House, Referee for, 208
Vose's Geometrical Drawing, 218
Voysbagh, Mr., gains the Patent Office Competition, 66

Walker's, Mr., Testimony before the Congressional Labor Committee, 97
Wall-Papers. Poisonous Paints and, 192
Walsh, Mr., and the St. Louis Custom House, 61, 146, 196
Walters, President, Address to the A. I. A., 172
Wash-Basins, 38
" Trays, 140
Washington, 201
Washington:—
Fall of a House in, 80
Monument, 25, 54, 121, 161
" Cleaning, 44, 201
Sewerage of, 216
The United Labor Association, 113
Workingmen. Cohen and the, 53
Water:—
Closets, 75, 80
Color Painting. French Criticism on English, 198
Fronts. Rollers and, 178
Jet in Excavation. The, 60
Mains in New York. Flooding open a, 25
Supply. English National, 13
" The Hartford, 200
Tests for Laymen, 7
Waterhouse's Address to the Manchester Architects, 57
Weathercock of Notre Dame. Loss of the, 192
Welbeck. Subterranean Work at, 84
Wells. Condition of Baltimore, 79
Webster on Ruskin, 196, 194
Whistler's Harmony in Yellow and Gold, 96
Pictures. The Nomenclature of, 109
Whither are we Tending, 18
Wilkie, Sir David, on Dutch and English Paintings, 160
William III. of Prussia. Monument of, 102
Willows and Railroad Embankments, 136
Window Sashes. Iron, 112
" Tax and Restoration, 68
Wind Pressure, 216
Wires. Underground Telegraph, 144
Wood:—
Bending Dry, 38
Pavements in Chicago, 110
Preserving, 112
Wooden Buildings. Stephen Girard's Will touching, 70
Woolner and the Copyright Commission, 129
Workingmen's Exhibition at Paris. The, 188
Workmen. Encouraging, 122
At Paris. British, 18
Workmen's Congresses. French and Newman, 40
Yellow Fever at Granada, Miss., 50
" In New Orleans, 129
Zinc. Chemically Coloring, 8

ILLUSTRATIONS.

[The figures refer to the number of the Journal, and not to the page.]

COLLEGIATE.

Chapter House of the Delta Psi Fraternity, Hartford, Conn. J. C. Cady, Architect, 156
Gymnasium at Concord, N. H. G. H. Young, Architect, 154

DWELLINGS.

Block of Three Houses. Samuel Hammeford, Architect, 134
Cottage at Claymont, Del. T. P. Chandler, Jr., Architect, 145
" at Elmira, N. Y. W. H. Hayes, Architect, 156
" at Lebanon, N. H. C. A. Rich, Architect, 147
" at Oceanic, N. J. E. R. Rossiter, Architect, 155
" at Providence, R. I., Walker and Gould, Architects, 150
" at Westchester, N. Y. H. R. Marshall, Architect, 141
Cottages, 156
Cottages. J. H. Hobbs and Son, Architects, 142
Country House. W. A. Bates, Architect, 138
" " A. B. Jennings, Architect, 138
" " R. G. Kennedy, Architect, 143
Design for a Villa, J. H. Hobbs and Son, Architects, 150
House for Mrs. Adams, Oyster Bay, N. Y. Potter and Robertson, Architects, 149
" of J. C. Bancroft, Milton, Mass. W. R. Emerson, Architect, 150
" on Commonwealth Ave., Boston. Kirby and Lewis, Architects, 152
" on Brooklyn Heights. W. H. Beers, Architect, 138
" at Chateau Landon, France. E. Letang, Architect, 148
" for C. E. Clark, Berkeley, Cal. Mooser and Banks, Architects, 143
" of L. Clephane, Washington, D. C. J. Fraser, Architect, 141
" of Prof. G. S. Fowler. Cabot and Chandler, Architects, 135
" for J. Fraser, Cincinnati, O. J. W. McLaughlin, Architect, 149
" of P. Lorillard. Pentlely and Stearns, Architects, 132
" at Newport, R. I. Sturgis and Brigham, Architects, 154
" at Oyster Bay, Long Island, N. Y. Potter and Robertson, Architects, 158
House 1437 Walnut St., Philadelphia. T. P. Chandler, Jr., Architect, 137
" for R. W. Poindexter, Berkeley, Cal. Mooser and Banks, Architects, 143
" at Scheneulady, N. Y. Potter and Robertson, Architects, 144
" at Sneeden's Landing, N. Y., J. C. Cady, Architect, 154
" of S. Scely, Stamford, Conn. W. R. Briggs, Architect, 142.
" of F. H. Smith, Boston, Mass. C. S. Luce, Architect, 141
" at Winchester, Mass. Ober and Rand, Architects, 137
Semi-Detached Houses, Dorchester, Mass. J. A. Fox, Architect, 145
Sketches for a Country House. Peabody and Stearns, Architects, 152.

FOREIGN.

Belgian Facade at the Paris Exhibition, 150
Château d'Amboise, 144
Château St. Louis, Quebec, Can. W. H. Lyon, Architect, 151
Church of St. Hilaire, Rouen. L. Sauvageot, Architect, 144
" of St. Paul, Rome. G. E. Street, Architect, 147
Halls of the Vatican, 137
Interior of a Russian Dining-Room, 146
Longitudinal Section of St. Paul's, London, 137
Monument to Henri Regnault, MM. Coquart and Pascal, Architects, 134
Municipal Offices, St. John, N. B. McKean and Fairweather, Architects, 152
Music-Room of the King of Bavaria, 151
Palace of the Trocadero. MM. Darloud and Bourdais, Architects, 136
Porte Guillaume, Cherbrg, 149
Rathhaus at Ruthenburg, 133
St. Lambert's Church, Münster, Westphalia, 156, 157
The Giralda at Seville, 156

FURNITURE.

Curio Case, F. W. Stickney, 155
Dining Room Furniture. G. Dawson, 153
Drawing Room and Dining Room Sets. Edw. Dowson, 133

HOSPITAL.

Hudson River State Hospital for the Insane. F. C. Withers, Architect, 139

HOTEL.

Hotel Brighton, Coney Island, N. Y. J. O. Prague, Architect, 141

INTERIORS.

Church of St. Lambert, Münster, Westphalia, 157
Dining Room in Hotel Cluny, Boston. J. P. Putnam, Architect, 139
Fire Place. Bicknell and Smith, Architects, 147
" W. W. Lewis, Architect, 143
Music Room of the King of Bavaria, 151
Reception Hall of Allemania Club. J. W. McLaughlin, Architect, 146
Russian Dining-Room, 146
Staircase. W. W. Lewis, Architect, 143
Staircase of the Hartford Capitol. R. M. Upjohn, Architect, 150

INTERIOR DECORATION.

Fire-Place. Peabody and Stearns, Architects, 132
Fire-Places. Competition in Interior Decoration, 134, 135
Vestibules. Int. Dec. Competition, 142

MERCANTILE.

The Gazette Building, Cincinnati, O., E. Anderson, Architect, 155

MISCELLANEOUS.

Alleyniah Club House, Cincinnati. J. W. McLaughlin, Architect, 146
An Architect's Alphabet, 132
Cemetery Gate Lodges. R. M. Upjohn, Architect, 138
Château St. Louis, Quebec, Can. W. H. Lyon, Architect, 151
Dairy for H. A. Whitney. Sturgis and Brigham, Architects, 153
Design for a Monumental Doorway. R. Vonnegut, 136
Extension of Harvard College Library. Ware and Van Brunt, Architects, 152
Fountain with Six Columns. R. D. Andrews, 136
Kindergarten. Ober and Rand, Architects, 147
Roller Skating Rink, Baltimore, Md. J. A. and W. T. Wilson, Architects, 153
Stairs for H. D. Rikey, Indianapolis, Ind. Ober and Rand, Architects, 151
The Moore Memorial. J. F. Hennessy, Architect, 135
The Salisbury Building at Worcester, Mass., S. C. Earle, Architect, 157

PERSPECTIVE.

Curvilinear Perspective, 143
Distortions and Corrections, 148
Perspective of the Circle, 131

PUBLIC.

Bureau of Engraving and Printing. J. G. Hill, Supervising Architect, 154
Patent Office. Restoration of. J. A. Fryclagh, Architect, 140
The Galveston Cotton Exchange. J. Moser, Architect, 133
The Hotel Cluny. J. P. Putnam, Architect, 139
The United States Capitol, Washington, D. C., 156
Town Hall for Milton, Mass. Ware and Van Brunt, Architects, 136
Town Hall, Milton, Mass. W. R. Emerson, Architect, 149
York City Market. A. Dempwolf, Architect, 144

RELIGIOUS.

Cathedral at Cape Haytien, Hayti. Cummings and Sears, Architects, 154
Christ Church, Oyster Bay, L. I. Potter and Robertson, Architects, 142
Church of St. Hilaire, Rouen. L. Sauvageot, Architect, 148
Church of St. Michael and All Angels, Baltimore. Wyatt and Sperry, Architects, 143
Church of St. Paul, Rome. G. E. Street, Architect, 147.
Design for the Lafayette Sq. Presbyterian Church, Baltimore. R. G. Lind, Architect, 139
Episcopal Theological School at Cambridge, Mass. Ware and Van Brunt, Architects, 156
First Unitarian Chapel, Malden, Mass. H. E. Burr, Architect, 142.
Grace Memorial Church, Darlington, Md. T. P. Chandler, Jr., Architect, 139
M. E. Church for Sea Cliff, L. I. Fiskin and Smith, Architects, 144
Pilgrim Chapel, Brooklyn, N. Y. J. C. Cady, Architect, 143
St. Paul's Church, Harrisburg, Pa. C. E. Cassell, Architect, 157
The Temple of Jerusalem. J. Fergusson, Architect, 146

STORES.

Store on Hawley St., Boston. Cummings and Sears, Architects, 153
Stores for H. Davidson, St. John, N. B. McKean and Fairweather, Architects, 147
Wood's Building. B. Price, Architect, 134
Vaughan Building, Providence, R. I. Walker and Gould, Architects, 142.

INDEX BY LOCATION.

Boston, Mass. Store on Hawley St., Cummings and Sears, Architects, 153
Cambridge, Mass. Episcopal Theological School at. Ware and Van Brunt, Architects, 156
Cincinnati, O. The Gazette Building, E. Anderson, Architect, 155
Concord, N. H. Gymnasium at, G. H. Young, Architect, 154
Elmira, N. Y. Cottage at, W. H. Hayes, Architect, 156
Harrisburg, Pa. St. Paul's Church, C. E. Cassell, Architect, 157
Hartford, Conn. Chapter House of the Delta Psi Fraternity, Trinity College, J. C. Cady, Architect, 156
Hayti. Cathedral at Cape Haytien, Cummings and Sears, Architects, 154
Münster, Westphalia. St. Lambert's Ch., 155
" Interior of the Church of St. Lambert, 157
Newport, R. I. House at, Sturgis and Brigham, Architects, 154
Oceanic, N. J. Cottage at, E. R. Rossiter, Architect, 155
Oyster Bay, Long Island, N. Y. House at, Potter and Robertson, Architects, 158
Providence, R. I. Cottage at, Walker and Gould, Architects, 150
Seville. The Giralda at, 153
Sneeden's Landing, N. Y. House at, J. C. Cady, Architect, 154
Washington. The Bureau of Engraving and Printing at, J. G. Hill, Supervising Architect, 154
Washington, D. C. The United States Capitol, 156
Westchester, N. Y. Cottage at, H. R. Marshall, Architect,
Winchester, Mass. House at, Ober and Rand, Architects, 137
Worcester, Mass. The Salisbury Building S. C. Earle, Architect, 157

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CONTENTS.

SUMMARY:—
Mr. Schleicher on the Present System of Annual Appropriations. — How Appropriations are actually made. — The Tone of Congressional Debate. — The Platform of the Cincinnati Typographical Union. — The Fall of the Forty-second Street Tunnel. — Verdict on the Mott Street Accident. — The Patent Office Competition. — The Memorial to Sir Gilbert Scott 1

PALÆMITAN ARCHITECTURE 2

THE ILLUSTRATIONS:—
An Architect's Illustrated Alphabet. — House of P. Lorillard, Esq., Newport, R. I. — Fireplaces in the same 4

FIRE-PROOF CONSTRUCTION, II. 4

AMERICAN VERNACULAR ARCHITECTURE, IV. 5

THE VENTILATION AND HEATING OF SCHOOL BUILDINGS . . . 5

COMPETITION IN INTERIOR DECORATION, V. 7

NOTES AND CLIPPINGS 7

MR. SCHLEICHER'S bill, as might have been expected, did not get to the front in the hurry of the last days of the session of Congress, and so has died a natural death. We have not even the satisfaction of judging from debate upon it how the House would have looked upon the change of policy in carrying on the public building which it proposed. Mr. Schleicher himself, however, in debate upon the general appropriations for public buildings, gave an outline of the arguments which he had to offer in support of his bill, in which he stigmatized the present system of building by annual appropriations as "crude and incorrect in principle; vicious, wasteful, and corrupt in practice." The greater or less annual allowance made for a building depended, he said, on the feeling or necessities of a congressional committee, not on any known principle. "When that amount has been expended the work ceases for that year, the walls are covered, the outfit and tools are put away to rust and rot, and the corps of laborers discharged until the following year, when the machinery is again set in motion by a piecemeal appropriation." This method of interrupted work, the result of the smallness of the annual appropriations, he called with reason crude and wasteful. As a matter of finance, he considered that building was not properly one of the current expenses of the Government, but an extraordinary expense, and therefore should be provided for by borrowing and funding, not, according to the "mediæval" system, by taxation.

WE will not follow Mr. Schleicher into the question of finance further than to say that there are two sides to it; that "mediæval" cannot nowadays be considered a name bad enough to hang a dog for, and that paying as you go is a habit that has its advantages in our time as well as in that of our grandfathers. Mr. Schleicher's arguments actually hold against the misuse of the system of annual appropriations rather than against the system itself. It is true, as he says, that "an economical Congress, intending to save money by making small appropriations, really wastes money instead of saving it;" and if the habit of making them annually tends peculiarly to this abuse, as perhaps it does, this is an argument against it. At all events, although it is the duty of Congress to guard against extravagant expenditure or misuse of the public money, where this is accomplished it is desirable that the public work should go on with as little interference as possible. The real difficulty lies behind the question of finance, in the fact that the appropriations are voted by an uninformed body and with an eye to other things than their legitimate use. They are apportioned as much to the influence of the town and the energy of its representative as to the exigency of the work. Congress, or the committee which fixes the amount, has its rough notion of what a post-office or custom-house for such and such a town ought to cost, which is always less than such buildings have actually cost. The local senator or representative has his notion of how much money ought to go for his town, or wants to get all he can. With these two grinding influences, and with more or less attention to the advice of the Supervising Architect, a limit is fixed by guess-work, which has usually to be enlarged two or three times before a building is finished, and in the end there is great complaint. This difficulty is independent of the manner in which the appropriations are divided or the money raised. It will not be got over until the appropriations are taken out of politics, with which they have properly no concern whatever, and fixed by an authority which knows what it is doing. This last will be done only when Congress delegates a part of its authority, a case that it is not worth while to discuss, or when it adjusts the appropriation on the information of a trusted officer, who shall explain in each case just what he proposes to do, and shall be held to justify by explanation all his demands. The system of annual appropriations has made it possible by its elasticity to get the government buildings built and to let Congress know what they were costing; but at the price of much inconvenience and under a false pretence. A limit of cost ought to be either merely advisory or else rigorously binding; but to be binding it should be made with accurate knowledge of what it is to cover. By the present system it pretends to be binding and is in reality only advisory.

THE one kind of discussion which such a bill was likely to call up may be inferred from the debates on the Eight-hour Law a while ago, and from some of the speeches on the appropriation bills at the close of the session, wherein it was urged by some Congressmen that it was the duty of the Government to relieve the present distress of the country and find work for the unemployed by undertaking public improvements with vigor. This sort of debate sounds very much like extracts from the platforms of the Socialists' and workingmen's public meetings. If so important a bill had been carried through by these arguments it would have been a strong encouragement of the spirit of Communism among workmen, and the harm of the debate might have outweighed the good of the bill. Such a way of relieving the hardship of dull times is like the use of alcoholic stimulants for physical depression: it creates an appetite which is never appeased, but grows with every indulgence. On this subject the New York *Times* had lately a very sensible article, saying that to so use the public money was only alms-giving by the Government, which was as much bound to provide for the needy of every other class as for a small number of workmen, and could do it more directly and economically by open charity than by a roundabout process that directed a good part of the money into the pockets of their natural enemies, the contractors.

As an offset to this tendency we have the failure of Congress to enact that a day of eight hours shall be paid for as a day of ten, and the order of the Secretary of the Navy which graduates the pay of workmen in his department according to the reduction of hours. The appointment of the Labor Commission of Congress does not please the Labor League, we are told, which holds to the popular notion that a commission to discuss any subject fairly must be composed of men who are already committed to decided opinions on it. We notice that one society of workingmen, the Cincinnati Typographical Union, in a circular issued as a call to form a Central Labor Union, which is of unusual good sense and moderation in tone, denies "most solemnly and emphatically all taint or suspicion of Communism, Socialism, Nationalism, or Politics." The circular adds truly, that "the relations between capital and labor are not as harmonious as they should be. Their relations being mutual," it says, "they should go hand in hand. In our opinion there are far more effective means of bettering the condition of our fellow-workingmen than by strikes, which can be perfected only by coöperation through such an organization as is now proposed." This looks like new light, and we hope it may spread; but then the trouble with most trades-unions has been that their only conception of what would better the condition of the workingmen was doing less work and getting more pay for it. To improve the quality of their work or cultivate their intelligence, or even to encourage the convenient virtues of thrift and temperance, has been beneath their care.

THE demands of travel have for a long time required that there should be some means of communication between First and Second Avenues at Forty-second Street, New York, which runs along a bluff in that part of the city. To make the

connection of the same grade with the avenues would involve making a deep and unsightly cutting, which would leave the existing houses perched in unsocial inaccessibility on either side of it. It was therefore decided to build a tunnel under the street, which should be two hundred and fifty feet long, with a span of forty feet; the rise of the brick arch above the granite abutments being ten feet. This work, like other city work, could be done only by contract, and bids were called for with the customary assurance that the maker of the lowest bid should have the work, provided he could furnish satisfactory bondsmen. This, Mr. J. R. Byron found no difficulty in doing, and three months ago the contract was awarded to him for $19,000, this being, it is said, $9,000 lower than the bid made by any other contractor. Too much weight should not be attached to these figures, for it is well known that the discrepancies between one man's bid and another's are perfectly inexplicable, even to the makers of the bids themselves. Work was begun at once, and at the time of the accident, on Friday last, one hundred and fifty-four feet of tunnel had been arched over with a brick vault composed of six layers of brick. The tunnel was built in sections seventy-five feet in length, and the centering had been some time removed from below the second section at the time that that fell and crushed to death an old man, who had gone under the archway in order to read his paper in the cool draught blowing through the tunnel. Since writing the above another body has been discovered, and as the ruins have not yet been all cleared away, the accident may have caused more deaths than is now supposed.

The immediate cause of the accident may have been the unequally distributed weight of the filling which was being packed in on the newly built section, which may have caused the collapse by forcing up the too lightly loaded crown. But examination of the ruins shows that there was possibly another reason for the accident. The heavy rains of the few preceding days probably did much damage to the mortar; but these could not have been enough to wash out every trace of cement and almost every trace of mortar in the fallen brickwork, as well as in that which still preserves its form, for it is said that what pretends to be cement-mortar has almost the appearance of pure sand, and is as friable as brown sugar. However negligent or criminal the contractor, who disclaims all theoretical knowledge, may have been, the Department of Public Works must share the responsibility, for one of its inspectors was detailed to watch over the work. This inspector is a master builder by trade, and should know the difference between good and bad work, and certainly between good cement-mortar and bad, unless, indeed, political influences may have caused him to forget momentarily his knowledge, for there are not a few who say that the extraordinarily low bid of the contractor was to be offset by claims for extras, engineered to a satisfactory issue for him by political tricksters and wire-pullers.

If the coroner's inquest shall bring to light evidence to show that the contractor was guilty of intentional or even unintentional criminal neglect, we hope to hear that the coroner's jury have returned as outspoken a verdict as was rendered on the late accident in Mott Street, New York. This verdict declares: That Martin Metzger came to his death by injuries received by the breaking of an iron girder in the building No. 190 Mott Street, on June 22, 1878. That Mr. H. Hermann, the lessee of the building, is responsible for not taking proper precautions in testing the building as to its strength and ability to withstand the weights placed in it in the prosecution of his business. The jury further recommended that a law should be passed making it the imperative duty of persons occupying or leasing premises for the purpose of carrying on other business, where weighty materials are to be used, to have the carrying capacity of the buildings thoroughly tested and certified to by the Department of Buildings.

Last week we stated that the Secretary of the Treasury had invited various architects to present competitive designs for the restoration and enlargement of the Patent Office at Washington; and that many had declined to compete on account of the inadequacy of the compensation. The Secretary has therefore addressed to the invited architects a second circular, stating that Congress had appropriated only six hundred dollars to this purpose, and that, out of regard to the protests of the profession, he had concluded so far to alter the scheme of the competition as to give the whole amount in one award to the successful competitor, according to the advice of a board of three architects selected by the Secretary. It would seem that the authorities are disposed, in this competition at least, to make every practicable concession to the architects, and we trust that they in turn may in their contributions be enabled to justify this unusual and unexpected attitude of the Government towards the profession. It is true that the programme is not one to make the largest demands upon the resources of design; to alter and enlarge a vast Greek Doric building like the Patent Office, with its blank mechanical repetitions of a misused order, is certainly not an inspiring theme; the scope for inventive genius in such a work is by no means great. Yet the effort satisfactorily to fulfil even such conditions as these may be sufficient to prove that if the architectural resources of our country are properly and fairly used, we may at length be enabled in our great public buildings to express somewhat of our highest civilization. By the present system the best professional ability of the country is practically kept from its proper monumental work, and confined to inconspicuous, often unworthy, and generally unremunerative fields of labor. Any effort on the part of the Government to change this state of things should be welcomed by the profession in no narrow or exacting spirit.

Early in June a public meeting was held in the Chapter House of Westminster Abbey, for the purpose of determining what should be done to commemorate the life and life-work of the late Sir Gilbert Scott. Of the many schemes that have been proposed, the most favored have been the restoration of the west front of St. Alban's Abbey, and the endowment of a scholarship in connection with the Architectural Museum, of which he was the founder. After some discussion it was decided, on the motion of the Dean of Lichfield, to "invite the assistance of the public towards carrying out a personal memorial in Westminster Abbey, and the endowment of a professorship or studentship in connection with the Architectural Museum." The Dean of Westminster, Dr. Stanley, in supporting the motion, said that it was not his desire, and he thought it would not be the desire of the Chapter, that this memorial should take the form of the execution of any of the three schemes for the improvement of the Abbey that Sir Gilbert was entertaining at the time of his death. These are: the completion of the stained glass in the Chapter House; the building of a new cloister, ample enough to give burial to the illustrious dead for a thousand years to come; and the remodelling of the north porch, once the principal entrance to the Abbey. These works the Dean thought should be accomplished either by the Dean and Chapter from their own resources, or by Government, who had already promised to provide the stained glass, or by public aid secured for these specific purposes. The Bishop of St. Alban's endeavored to turn the decision of the meeting in favor of St. Alban's Abbey, pleading that it had no promise of government aid, and had no wealthy Dean and Chapter to carry on the work. He was reminded that it would be as appropriate to finish the west front of Lichfield Cathedral, or complete various other undertakings, which, as much as the work at St. Alban's, were equally "last works" of Sir Gilbert. All things considered, it seems most suitable that there where his body lies, in one of the few buildings where intra-mural interments are still allowed, a memorial should be erected which all men can recognize as such, a recognition which would be difficult of accomplishment in the case of stained glass, a half-finished cloister, or a restored porch. As between the scholarship and the restoration of St. Alban's the right choice seems to have been made, for never will there be a more appropriate occasion for founding such a scholarship, which is, moreover, as a memorial, most professional in its character, while it is not unlikely that the Bishop of St. Alban's will find other means of securing money for his restorations.

PALERMITAN ARCHITECTURE.

The capital of Sicily is, as we have already implied, the headquarters of an architectural style which is historically one of the most interesting forms that the art has ever taken, and it contains examples of other styles which are well worthy of attention. But its really most important buildings are not those which are the first to thrust themselves on the eye. Not a few of them have to be looked for; the noblest of all is elaborately stowed away out of sight. The best churches and houses have either been elaborately spoiled, or have

always stood in the less prominent quarters of the city. The metropolitan church and the royal palace stand prominently enough in their several open spaces; but both have grievously suffered. The noblest feature of the palace, the renowned and matchless chapel, can be seen from no external point at all. Truly all glorious within, it is only within that it can be seen at all. The best private palaces stand in secondary, sometimes in very narrow, streets, and sometimes only scraps and fragments of what has been are left. Only one at once forms a prominent object and keeps any great measure of ancient character. The changes which have taken place in the lay of the city absolutely forbid the existence of walls or gates of any great antiquity. It is only some small parts of them that are even mediæval; the greater part belongs to the days when walls and gates were needed, not to keep off foreign enemies, but to keep Sicily and her capital in bondage to the foreign enemy who called himself her king. The general aspect of the two great streets, the Cassaro or Toledo, once the Via Marmorea,— we cannot bring ourselves to speak of Via Vittorio Emmanuele, — is that of a stately city of the seventeenth and eighteenth centuries. Italian church fronts, built without regard to east, west, north, or south, with their attached monasteries, range with the houses in the street. The houses are solid, and are furnished with specially solid balconies. The long line of the Toledo, a mile or more from the eastern sea to the western gate, filled as it commonly seems to be with a crowd of human heads, is a striking sight. Palermo, after all that it bore at the hands of its Spanish lords, if it did not remain the rival of those German and Italian cities where history looks us in the face at every step, at least never fell so low as Bavarian Athens, as Haussmannized Paris and Rouen, or as the city which is rising on the *colles* of Rome to make us look with some measure of regret on the works of the very Popes themselves.

Still, in these two long lines of street, stretching as it seems to the eye from the mountains to the mountains, and from the mountains to the sea, there is but little of historic architecture, save at two points where the long line of the Toledo is broken, at one end by the Piazza del Duomo, and at the other by the Piazza Marina. Of these the former, as its name implies, contains the metropolitan church; the other contains the most important, in a general view, of the buildings which were reared as private palaces, that now known as the Tribunal. In the elder times the waters of the harbor flowed between them, and the line of the Cassaro, the Kasr, was far longer than it is now. The same opening brings in the view of the portion of the church of Sta. Maria della Catena, the church which stood by the chain which guarded the harbor, and whose portico is one of the best of the later buildings of Palermo. Otherwise, the look of the four great arms, stately and solid as it certainly is, is wearisome enough. It has not a trace, nor has any part of Palermo a trace, of the best feature in civic architecture which the revived classic styles can supply. We look in vain for anything of that system of arcades which has such an effect in Bologna, Padua, and other Italian cities. In the general effect of these streets the only point of antiquity or interest is to be found in the shops, the openings of which present many singular and interesting forms. It is in the narrow, crooked streets which fill up the four *regiones*, each with its presiding virgin saint, into which the cross lines divide the city, that we find the fragments of ancient Palermo. There the eye of the traveller must never be closed; every corner must be carefully explored. A careless observer might fancy that there was little left but the royal palace, the cathedral, and the Tribunal. He must look more narrowly, and he will find that the great days when the Saracen built at the bidding of the Norman have, after all changes, left no small traces behind them.

The great monuments of Sicily belong to two periods,— to the two periods of Sicilian greatness. There are the works of the Greek commonwealths, and there are the works of the Norman kings. Of Roman remains there must be much below the ground, and there is something above; but they do not form a marked feature, as in Italy and Provence. Byzantine and Saracen rule have indeed left their stamp behind them; but it is a stamp impressed at second-hand. Constantinople and Bagdad are dumb as far as their own voices are concerned, though both speak plainly enough by the tongue of a Norman dragoman. Of the later mediæval styles, the examples are, to our taste, greatly to be preferred to any of the kind on the Italian mainland; but till quite the end of the period they hold a very secondary place when compared with the masterpieces of French, German, and English art. The days when Corinth sent her fleets to colonize Syracuse, and the days when Palermo sent her fleets to harry Corinth, are the two great times whose mighty records in stone still abide on Sicilian ground.

Of these two periods the capital of Sicily has her share in the latter only. Phœnician Panormos had no part or lot in the glories of Gelôn and Timoleôn. Yet the Roman colony undoubtedly possessed Roman buildings; the fact needs no proof; and, if it did, an occasional mosaic found below the present level, an occasional column used up again in the arcades of a church or at the corner of a palace, would be proof enough. Nor can we venture to say that no Greek buildings went before them. As non-Hellenic Segesta boasts of one of the most perfect of Greek temples, non-Hellenic Panormos may well have rivalled her. Again, we need not prove, and, if it were needed, we know the fact historically, that the Christian city had churches, that the Mahometan city had mosques. But temples, palaces, churches, mosques, have all perished, except so far as palaces, churches, and mosques supplied both models and materials for the works of the great dynasty which for a century made Palermo the head of the most brilliant of European kingdoms.

It must always be remembered that it was only with the Saracen conquest that Palermo became the head of Sicily. From that day Syracuse shrank up and Palermo grew. It not only became the head of Sicily, it became one of the great cities of the Mussulman world. And it was emphatically the Mussulman city of Sicily. If we rightly understand the story of the Norman Conquest, no Christian church was allowed within its walls; the Greek archbishop was confined to a small chapel outside, while the former metropolitan church had become the head mosque. The first act of the conquerors was to install the banished prelate in the seat of his predecessors. The great age of Sicilian architecture was the twelfth century, and the architecture of that age is undoubtedly the Saracenic architecture, continued in use and adapted to Christian and European purposes. This Saracenic architecture is of course in its origin Byzantine, but modified by the introduction of the pointed arch. This style is so unique and so interesting on every historical and artistic ground that we must keep some of its more remarkable monuments for a more special notice. We mention it here in its historic order as the Palermitan style of the twelfth century. There is here no Romanesque style answering to the styles of England, Gaul, Germany, or Italy. The place of the later and finished Romanesque is taken by what we can call nothing but the Christian Saracen style.

In truth, so far as Palermo has anything which answers in the faintest degree to ordinary Romanesque, it belongs to a later time,— to the time which elsewhere is the time of the earlier Gothic. In the thirteenth, fourteenth, and even in the beginning of the fifteenth century we find a style which, like the Saracen style, uses pointed arches, but whose details are rather those of the transition from Romanesque to Gothic. We can see some of the steps by which the Saracenic type changes into this second Sicilian style, pointed Romanesque rather than Gothic. It is hard to explain the changes without illustrations, and without going into great technical detail; but any one who can compare the east end of the cathedral with the west, and that again with the monastic buildings of St. Salvatore and the palace called Casa Matteo, will be able to follow them. To say so is perhaps rather a mockery. Several works, though mostly large and costly, illustrate the ecclesiastical buildings of Palermo; we know not whither to send any one for even a photograph of most of its domestic buildings. Even dwellers in Palermo seem hardly to know the existence of the Casa Matteo; yet it is something thoroughly Palermitan. It is a characteristic example of a once splendid range of building in a street which has gone sadly down in the world. The street without must, even in the best of times, have been so narrow that it is hard to tell whether a range of windows, outlining anything of the kind which we ever saw in domestic work, and coming nearer to Northern Romanesque than anything else in Palermo, has its arches round or pointed. Get on the opposite balconies, the only way, and you learn that there are some of both. Through these stages the Saracen style passes into a *quasi*-Gothic, which is decidedly better than any form of Italian Gothic, but which still is, in its doorways and windows, — almost the only features by which we can judge of it, — very flat, trusting quite as much to surface ornament as to mouldings strictly so called, and hardly getting so far as even plate tracery. A building which we have glanced at more than once, the Chiaramonte palace, afterwards the abode of the viceroys and then of the Inquisition, and therefore still known as Palazzo de' Tribunali, is a marked example of this style, and is almost the only domestic building in Palermo besides the royal palace which stands out prominently in a good position. It stands in the Kalsa, and it may stand on the site of the palace of the Emirs; but, as it now stands, it is a work of the years from 1307 to 1320. So far as it could have stood in England at all, it would have been set down as more than a hundred years earlier. Ten years later a rival noble named Sclafani vowed, and carried out his vow, to build in one year a greater palace than Chiaramonte had built in thirteen. First a palace, then a hospital, now a barrack, the Sclafani palace falls even farther back from our notions of a fourteenth-century building, and keeps some distinct features of the old Saracenic. Yet there is in it one little niche more like early Northern Gothic than anything else in Palermo. Here and there, as in the churches of St. Augustine and St. Francis of Assisi, doorways and windows of this style may be found, and we now and then light on them in domestic buildings. Its remains are always striking; in a stern, fortress-like looking house like the Chiaramonte palace, their flatness and half-Romanesque character is not out of place. But we are not clear, as we hinted when speaking of some of the Savoyard buildings, whether the latest form of good Palermitan architecture has not a greater interest than this intermediate form.

The style which we have just been describing lingers on into the fifteenth century, to the first years of which the tower of St. Nicolas in the Albergheria is assigned. In the course of that century it was supplanted by a form of late Gothic, distantly akin to French, or rather Burgundian, Flamboyant, but quite unlike anything in Italy. We now get, what we do not get in the earlier style, deep mouldings and most elaborate tracery. But the rounds and hollows of the mouldings are often set on a single plane, giving a wonderfully flat

look, and the tracery, most delicately wrought and supported on the slenderest of shafts, is usually placed under square or flattened arches. The flattened arch, which should be, but which is not always, elliptical, is also in constant use in the doorways; and the round arch, hitherto hardly seen in Palermo, now and then comes in. The best preserved specimen of this style is the Patella palace, with its striking gateway and square-headed windows. This was built in 1495 by Francesco Patella, who commemorates his exploits in a way which at first sight is puzzling:—

In Gallos inque Hispanos sub rege Sicano
Proelia quæ gessi rex mihi testis erit.

It needs a little thought to take in that "rex Sicanus"—so called with singular propriety rather than "Siculus"—means Ferdinand of Aragon, and that the "Hispani" of the inscription can hardly mean any one but the Moors of Granada. This is a truly insular way of looking at things, to which we have tried in vain to find or to invent an Irish parallel. There is a good deal of this style scattered up and down Palermo, both whole houses and scraps. The other chief example besides the Patella is the palace called Palermo, Moncada, and Ajutamicristo, in which Charles the Fifth lived after his return from Tunis. This is much larger than the Patella, but not so well preserved. In the archbishop's palace is a large window of this style with a pointed arch, a thing unique, or nearly so, in Palermo.

The effect of this late Palermitan Gothic is by no means bad; but it is perhaps almost more remarkable for the effect which it had on the local Renaissance. It is, in short, hard to draw the line between the two. The column seems never to have gone out of use; only we see slight marks of Renaissance in the capitals, while everything else is still late Gothic. In some palace courts, specially in that of the Palermo, in the portico of Santa Maria della Catena, and in the lower part of Santa Maria Nuova, this stage comes out with excellent effect. The two porticos suggest for a moment the fifteenth and sixteenth century Romanesque of the Dalmatian Ragusa. (Here in Sicily, where there is another and less famous Ragusa, a case of "two Wissesters," the distinction is needed.) But a second glance shows that they could have been built only by men who were used to the same late Gothic which we see in the palaces. Graceful columns support flat moulded arches set, Saracen fashion, on stilts. They are in truth the best examples of a variety of Renaissance with much of Gothic feeling hanging about it which is characteristic of Palermo. Springer, in an excellent treatise, "Die Mittelalterliche Kunst" in Palermo, remarks that as the Saracenic style influenced the early Gothic, so the late Gothic influenced the Renaissance. Sicily, it would seem, did not at any time easily take to new ways. There is much of this style in both churches and houses. Doorways and windows keeping some traces of mouldings, columns — real columns — supporting elliptical arches, a general fondness for that form of arch in all cases, keep up some memory of better things to a very late date. And, just as the Renaissance was coming in, the church of the Spasimo, built in 1506, might almost be a bit of German Gothic. This, however, is purely exotic. More interesting locally is the tower, one of the few *campanili* of Palermo, of Santa Maria della Grotta, where this architecture may be well studied. The local type gradually goes off from this very curious and interesting intermediate type into all the horrors of a vulgar Italian style, gaudy within and shapeless without. Of hideous churches of this kind attached to the endless and mostly hideous nunneteries Palermo is full. Some of the street fronts of both churches and houses keep a certain stateliness of their own kind. But go behind, and see their notions of aisles and clerestories. A good building of any good style will bear being seen naked:—

Induitur, formosa est; exuitur, ipsa forma est.

Let it be perfectly plain, and we see the lines of its outline all the better. If enriched, it is enriched by adorning the necessary features. In the Jesuit style, the naked building has no outline; it is simply hideous; the ornament is not made out of the essential features; it is smearching nailed or plastered on. And this kind of stuff, *barocco* or *rococo*, or whatever its name is, has come to line the Kasr of the Saracen, the Via Marmorea of the Norman. One peep of day is given through the Porta Nuova at the west end. Built late in the seventeenth century, it has a top to it, and it has a small decorative arcade, which might almost be Romanesque. And even where all else has vanished, courts and cloisters often keep very decent arcades, the bases of whose columns still show, in Jesuit days, the leaves which with us died out in the thirteenth century. The arch rising boldly from the column is everywhere a relief. Even if a stilt is thrust in, it may remind us of Ravenna. But wherever the arch rises straight from the abacus, be it in a Spanish palace, be it even in a Jesuits' college, it carries the thoughts back to the works of Justus in his own home. — *The Saturday Review.*

THE ILLUSTRATIONS.

AN ARCHITECT'S ILLUSTRATED ALPHABET. PAINTED BY F. WEEKES, ESQ.

We reproduce this week from the *British Architect* the first portion of an illustrated alphabet that Mr. Weekes has painted for the new house of Mr. Walter Barges, the architect, in Kensington. The figures are painted upon the panels of the bookcase doors in the library, and are left to tell their own story.

HOUSE OF PIERRE LORILLARD, ESQ., NEWPORT, R. I. MESSRS. PEABODY AND STEARNS, ARCHITECTS, BOSTON.

FIRE-PLACES IN THE SAME.

FIRE-PROOF CONSTRUCTION.[1] II.

The shafts of cast-iron columns should be continuous from middle to middle of the floor thickness, enveloped with not less than one inch of some fire-proof, non-conducting material, securely held to the shaft by buttons or ribs imbedded in the material. The capital and base should be of cast or sheet iron, fastened to lugs or bosses cast on the shaft and long enough to pass through the envelope (see Figs. 6 and 7).

If light partitions are required, such as do not start from the foundation, and for which common brick would be impracticable by reason of its weight, hollow terra-cotta tile or brick can be used. Another method, more expensive, but admitting a construction which is self-supporting, consists of

CAST-IRON COLUMNS.
No portion of the constructive iron-work exposed.

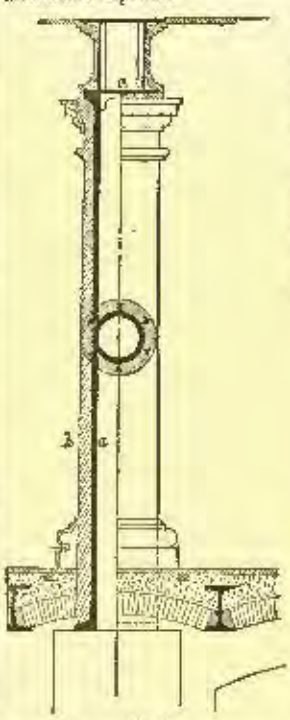


Fig. 6.
Inner shell of shaft of cast-iron; *a*, fire-proof, non-conducting material.

SECTION ELEVATION.
No part of the iron exposed.

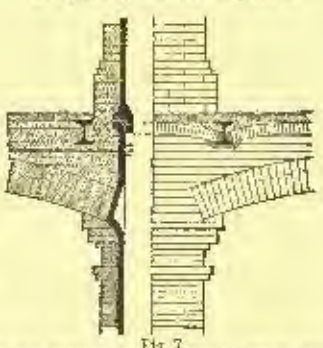


Fig. 7.
Cast-iron column protected by 4½ ins. of brick. Instead of girder, brick arches are sprung between columns for supporting the floors.

light I-beams, generally four inches deep, placed vertically two feet from centres, with the ends riveted or bolted to plates or channel-irons secured to the floor and ceiling; to these beams the iron lath is bolted for receiving the plaster. These partitions can be readily transferred, so that they add no weight to the floor from which they start.

All steep parts of slated roofs are provided with rolled iron purlins, T or L shaped, weighing about two pounds per linear foot, riveted to the jack-rafters or trusses. The spans of these purlins should not exceed six feet for slate weighing ten pounds each. The distance between centres of purlins depends upon and is always equal to the weathering of the slate; one purlin is required for each line of slate; for example: A slate 12 x 24 inches, showing ten inches to the weather, with four inches lap, requires the purlins to be ten inches from centres. The slate is fastened to purlins by No. 16 B. W. G. copper wire passing through two holes in the tail of the slate and around the purlin (see Fig. 8). Another method, more expensive, but in proportion to its greater security, consists of two $\frac{5}{16}$ inch diameter bolts with heads countersunk in the slate, and fastened with a nut to a hook hanging to the purlins (see Fig. 9). Instead of purlins, corrugated sheet-iron is sometimes used, running from rafter to rafter; to this the slate is fastened by wrought-iron pins, countersunk and passing through the slate and corrugated sheets, where they are bent so as to form a hook or clinch; the slate may also be bedded in a layer of cement applied to the corrugated iron (see Fig. 10).

SLATED ROOF.

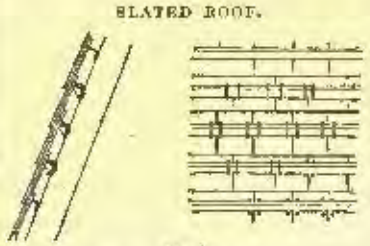
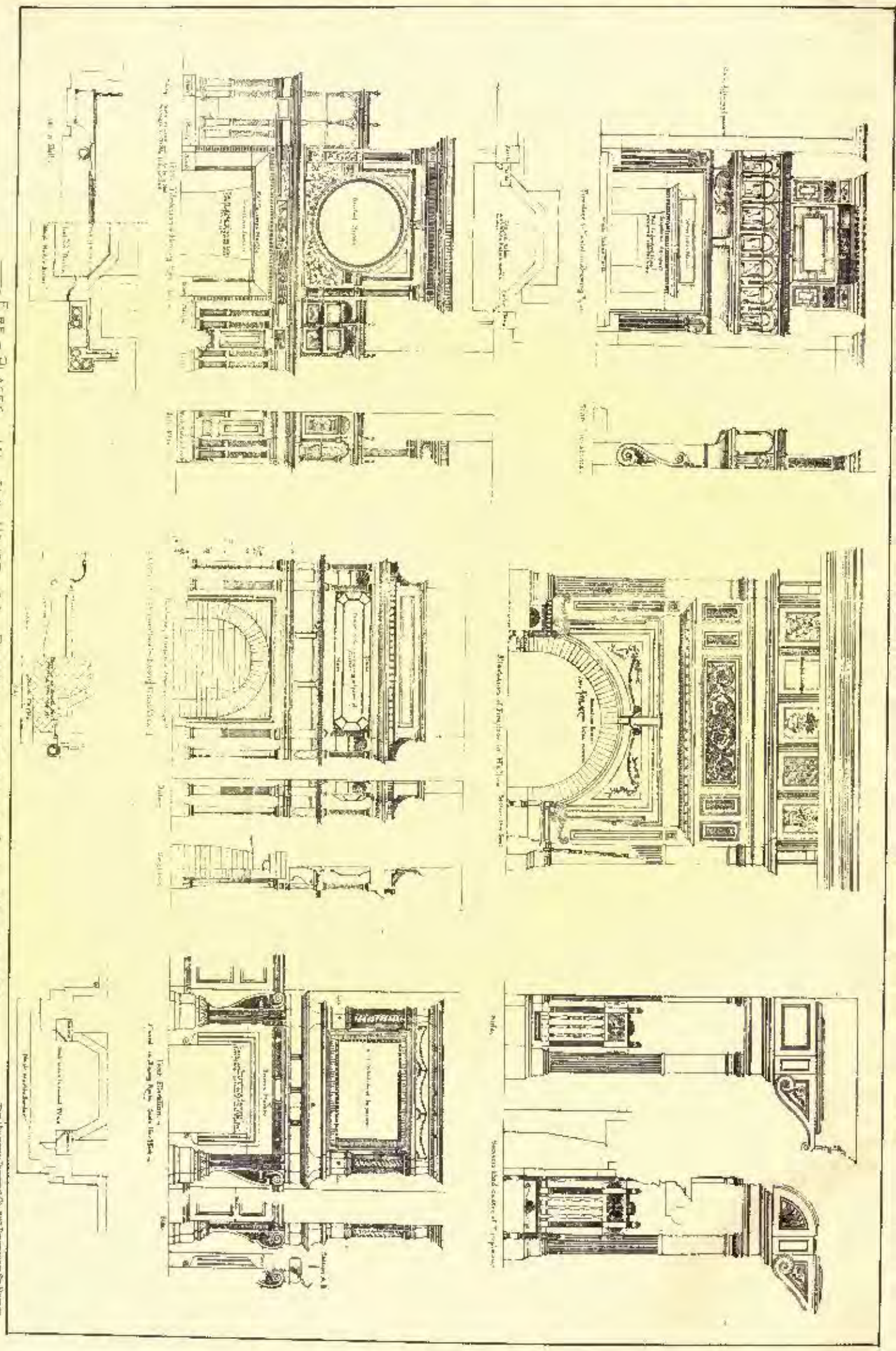


Fig. 8.
INSIDE VIEW OF SLATE AND PURLINS.
Slate fastened to L or T shaped rolled iron purlins with No. 16 B. W. G. copper.

Fig. 9.
Wrought-iron countersunk bolt, 7-16ths diameter, and hook, 1″ x 1-8th, hanging to purlin.

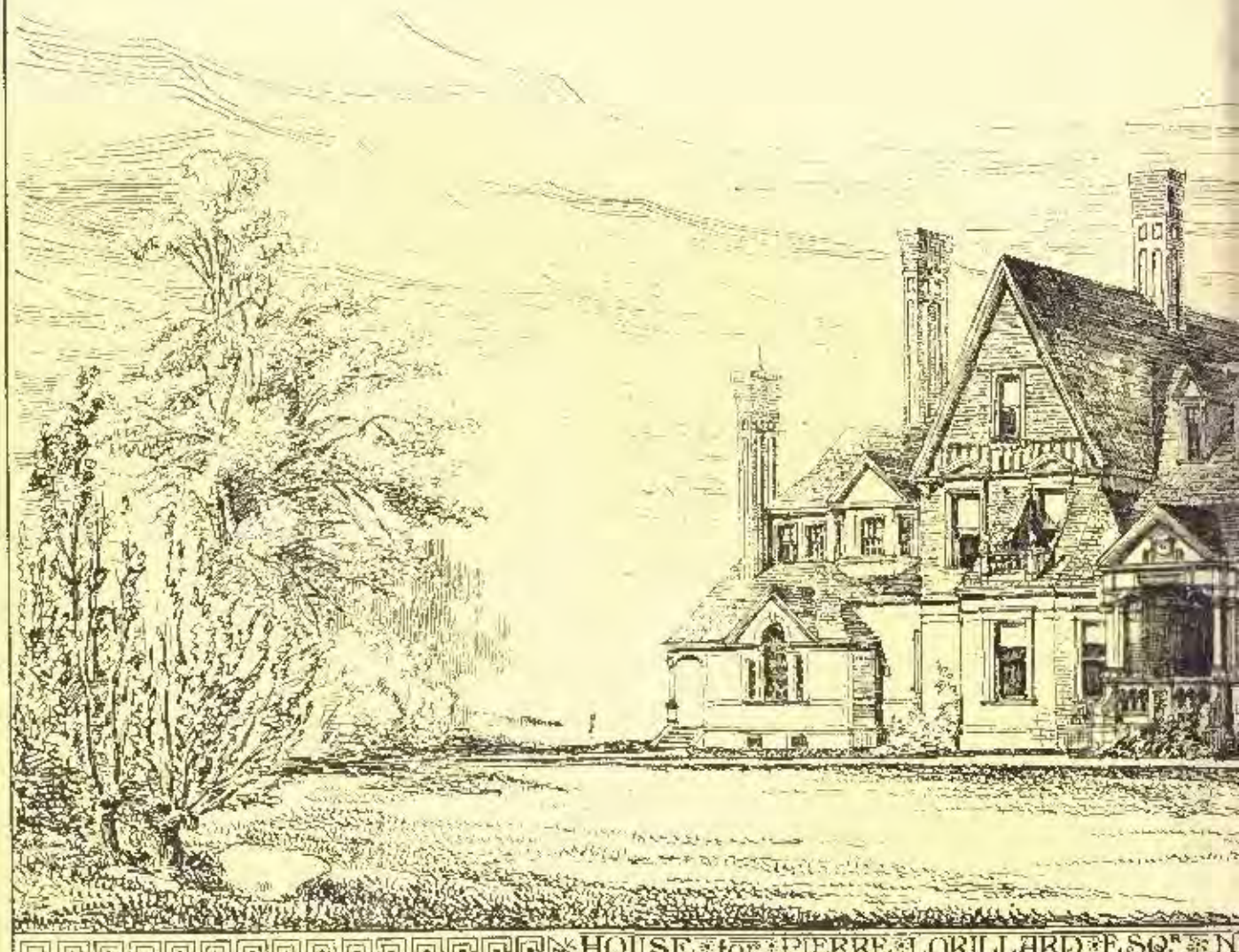
Fig. 10.
Slate fastened to corrugated sheet-iron by wrought-iron countersunk pins. Slate is also bedded in a layer of cement applied to corrugated iron.

[1] A paper by F. Schumann, C. E., read at the last annual convention of the American Institute of Architects.

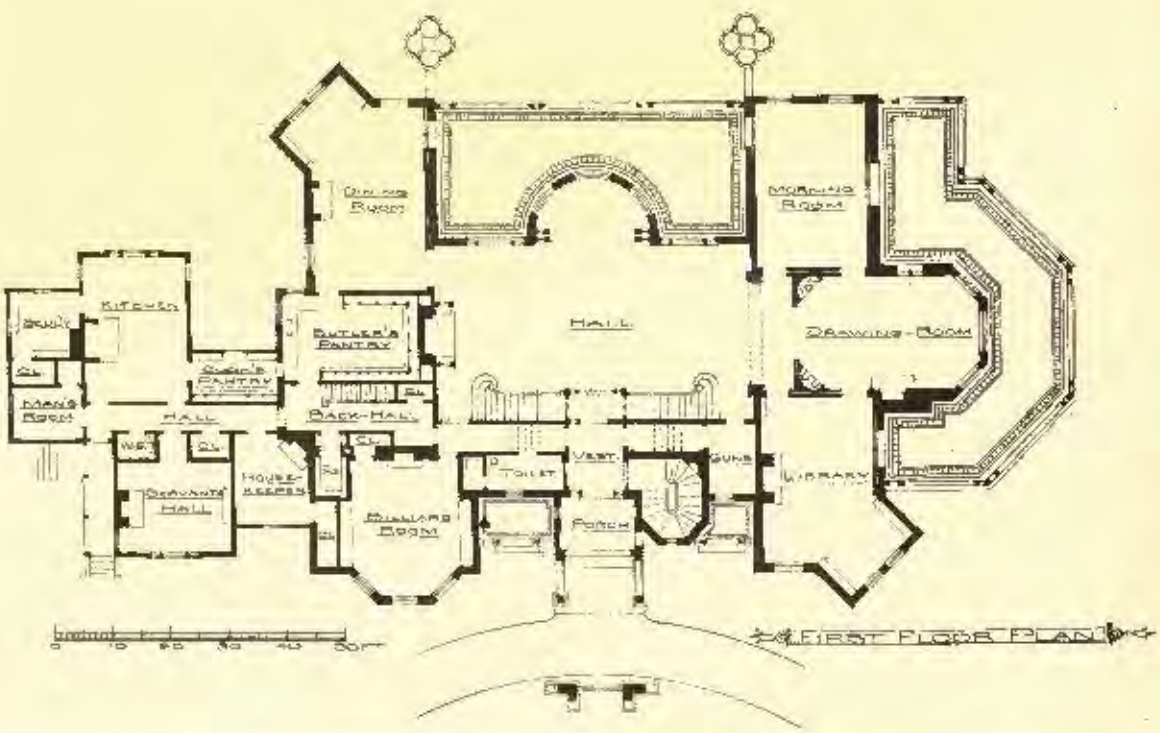


FIRE-PLACES IN THE HOUSE OF PIERRE LORILLARD ESQ. NEWPORT R.I.
PEABODY & STEARNS ARCHTS.

THE HELIOTYPE PRINTING CO. 220 DEVONSHIRE ST. BOSTON.

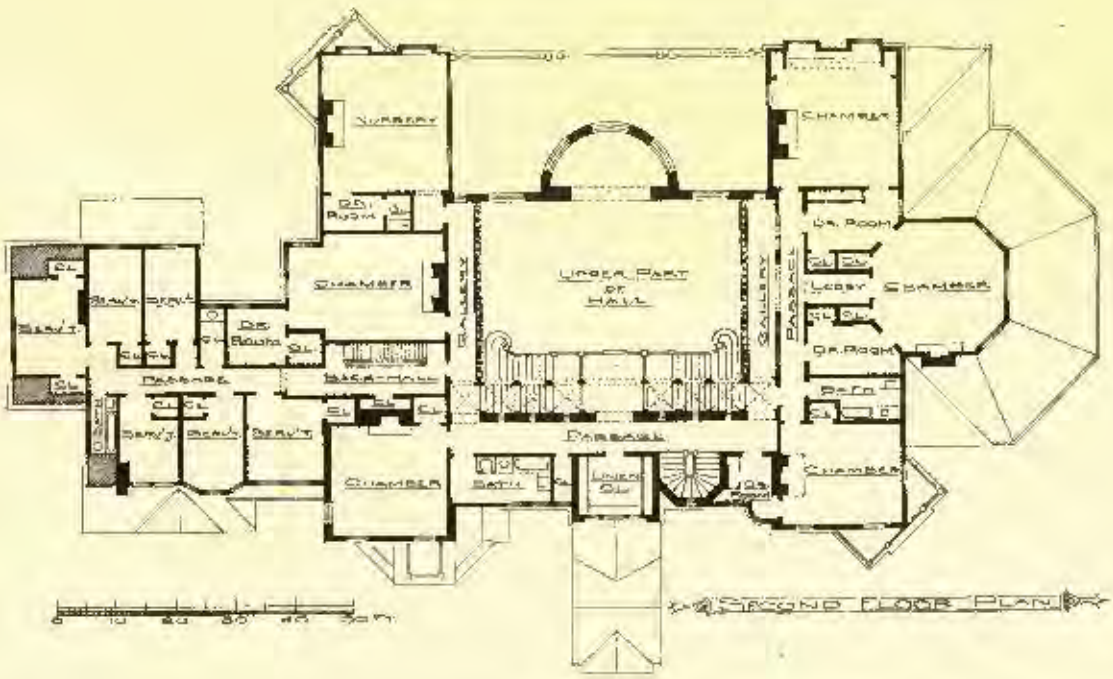


HOUSE for PIERRE LORILLARD ESQ^R N



FIRST FLOOR PLAN

VPORT R·I Peabody & Stearns Arch^ts Boston Mass



THE HELIOTYPE PRINTING CO. 220 DEVONSHIRE ST. BOSTON

THE VALENTINE PRINTING CO. AND ENGRAVING ST. BOSTON

FLAT ROOFS COVERED WITH METAL SHEETS OR CEMENT.

Fig. 11.

ARCHES OF CORRUGATED SHEET IRON No. 20 B. W. G. Weight of construction from 18 to 60 lbs. per sq. ft. *a*, corrugated iron arch; *b*, rolled beams; *c*, concrete filling; *d*, layer of cement; *e*, metal tags for fastening metal cover.

Flat parts of roof are covered with either cement, copper, lead, zinc, tin, or galvanized sheet-iron; either one of the metal coverings are fastened to a layer of cement, about one inch thick, overlying concrete supported by corrugated sheet-iron arches, by the tags imbedded therein (see Fig. 11). The supporting material may also consist of burnt clay tile, resting on T-irons (see Fig. 12). Another very good method consists of metal boxes filled with fire-proof material; the boxes are about two feet wide, from two to three inches deep, and of lengths up to eight feet spans; the bottom, sides, and ends are formed of galvanized sheet iron, and the top of copper or galvanized sheet-iron; the boxes are placed alongside of each other and fastened to the beams of the roof. This method possesses an advantage in that it is light, strong, overcomes the difficulties from expansion and contraction, and forms a smooth ceiling (see Fig. 13).

Fire-proof doors and shutters are indispensable. They consist either of sheet-iron boxes filled with fire-proof material, or layers of corrugated sheet-iron riveted together; they are also made of a sheet-iron plate surrounded by an iron frame forming an open box, into which a fire-proof preparation is filled and secured by lath of a peculiar construction; this is an effective shutter or door, in that the fire-proof material is directly exposed to an encroaching fire and no part of the metallic construction is in danger of warping and the material falling out. It is essential, to insure a proper working condition of shutters in warehouses or factories, to so construct the shutter that it can be attached to the glazed sash, and that both will slide on the same bar or track, so that the sash cannot be opened without also moving the shutter. In buildings where subdividing fire-walls are made use of, it would be well to so arrange the shutters that they can be operated from an adjoining room or compartment by means of rods or endless chains.

Fig. 12.

BURNT CLAY TILE, ABOUT 16 INS. SQUARE AND 8 INS. THICK.

Weight of construction from 15 to 20 lbs. per sq. ft. *a*, tile; *b*, rolled T-iron; working from 5 to 6 lbs. per linear ft.; *c*, layer of cement about 1 in. thick.

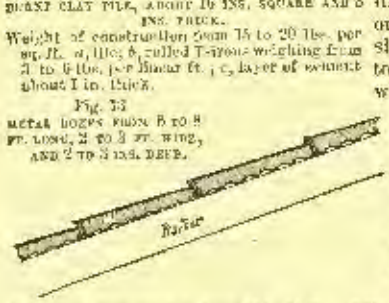


Fig. 13.

METAL BOXES FROM 2 TO 8 FT. LONG, 2 TO 3 FT. WIDE, AND 2 TO 3 INS. DEEP.

Weight of construction from 12 to 15 lbs. Boxes are filled with non-conducting fire-proof material.

Fig. 14.

ORDINARY FLOORS.

Maximum weight 40 lbs. per sq. ft. The filling may consist of clay mixed with cut straw. *a*, joists; *b*, counter-ceiling; *c*, wooden ceiling; *d*, flooring; *e*, fire-proof, non-conducting filling.

Fig. 15.

ORDINARY FLOORS.

Maximum weight 30 lbs.; is more effective than Fig. 14 against fire from below.

Class III. All girders, joists, struts, and roof timbers to be of wood and, if possible, of large scantling. All floors to be counter-ceiled so that not less than two inches of non-conducting material will lie between the flooring and counter-ceiling. The spaces between the scantlings of partitions to be filled with mortar or a mixture of clay and cut straw not less than one foot above the floor level (see Figs. 14, 15, 16).

The roof construction may be of wood. For the slated parts strips of wood 2 x 2 inches are nailed horizontally to the sheathing boards; the spaces between strips being filled, level with their tops, by a mixture of clay and cut straw or any other fire-proof non-conducting preparation. The same method is also used for flat parts of roofs; the metal tags for holding roof covering being nailed to strips.

The sketches hereto attached illustrate the various methods described.

Fig. 16.

SQUARE FOR DOOR ROOMS.

Joist of large scantling from 4 to 8 ft. apart. Maximum weight 60 lbs. The dotted line represents a continuous coarse wire netting, nailed to joist and imbedded in the filling; it is for the purpose of retaining the filling in place should the ceiling boards be burnt through.

AMERICAN VERNACULAR ARCHITECTURE. IV.

PUBLISHERS of the experience of Messrs. A. J. Bicknell & Co. probably have excellent business reasons for printing such compilations as their Specimen Book of One Hundred Architectural Designs,[1] which by the by does not fulfil the promise of its ample title, either in respect to the number of the designs, of which there are by no means one hundred, or as regards bills of materials, of which there are but two and these useless, or as regards specifications, of which there are none at all. But it is not easy for the general or the professional reader to understand why the market, already overburdened apparently with such works, should be charged with this new fardel. It is a disjointed and illiterate collection of wood-cuts mostly blurred by long usage, borrowed from a dozen authors, and each accompanied by a brief description in various types, giving also the price and title of the work from which it is extracted. It is in fact an illustrated catalogue of such works as Bicknell's "Village Builder," Cumming's "Architectural Details," Atwood's "Modern American Homesteads," Hussey's "Home Buildings," Croff's "Progressive American Architecture," Allen's "Rural Architecture," Gardner's "Home Interiors," and Woolett's "Villas and Cottages." Two dilapidated wood-cuts out of Wirlars's "Church Architecture" are not sufficient to redeem the collection from its essential character of vulgarity. The book, however, has the curious advantage of presenting to the student a clear proof of the essential unity of our Vernacular Architecture. The many minds herein represented as working upon the American theme of house building have fairly kept to the dead level. Scarcely has one succeeded in extricating himself from the strong entanglement of "the popular styles." The best of these designs are the simplest; the worst are those which are most freely given up to decoration. In the latter we recognize an extraordinary unanimity of bracketed cornices; steep bastard French roofs in every variety of simple and complex curvature, fretted with cheap finials and crestings, and broken with compound gables, dormers, and towers; windows with every form of arch, and enclosed with architraves and cornices such as the carpenters' fancy so lavishly bestows upon our suburban villas; porches and verandas richly jig-sawed; and, in short, all those features made familiar to us in the neighborhood of every large American town, and to be seen nowhere else in the wide world.

In the presence of such diverse witnesses it cannot be denied that we have an architecture of our own, with its distinct characteristics, based, as we have more than once had occasion to say, upon legitimate conditions of living and material, but developed by untrained hands into painful absurdities and exaggerations. We leave it to others to draw inferences as to the significance of these developments in their relation to national character. We do not believe, however, that a careful tracing of effects back to causes would flatter our self-esteem.

Concerning the function of the architect under such circumstances we have no question: it is plainly to simplify and to purify; to distinguish his work by self-denial and reserved force; to chasten and correct this national exuberance of fancy. He may be assured that every builder in his neighborhood will have his eye upon the new idea which is thus taking shape, and the lesson will not be lost. The characteristics of our popular architecture which we have noted are for the most part grafted upon a good stock. The ground-work and plan of our common dwellings are reasonable for the most part, and a natural growth out of our habits and necessities; but this architectural blossoming is extraneous, and for it we are primarily indebted to the influence of untrained architects. There are now in the profession men of education, sufficient in number, though few, to leaven the whole lump, if they will only keep free from the affectations of their knowledge, will not masquerade with foreign shapes unsuited to our conditions and strange to our customs and climate, and will content themselves with developing our own natural and proper heritage. The vast majority of house-building people do not employ architects but are satisfied with the services of carpenters and builders. These are prompt to borrow from the works of the nearest architect, such decorative ideas as they can comprehend, and although, by passing through the alembic of untutored imaginations, these ideas become naturally somewhat distorted and vulgarized, yet, if the ideas are good in the beginning, the result of this irregular copying is of course less liable to be bad than if it started from an indifferent original. The responsibility of the architect therefore seems to extend far beyond his own immediate interests or those of his client. It is for him to assist in moulding the vernacular architecture into shapes consistent with the higher civilization. It is from this that the first impulse of improvement must come, and if, in his designs, he is loyal to the conditions of life by which he is surrounded, he becomes a direct and active agent of reform.

Let us then respect the vernacular forms.

[1] Specimen Book of One Hundred Architectural Designs, showing Plans, Elevations, and Views of Suburban Houses, Villas, Sea-Side and Camp-Ground Cottages, Homesteads, Churches, and Public Buildings, including Specifications, Bills of Materials, etc.; also Several Original Designs for Modern Styles of Mantels and Furniture, prepared especially for this work. New York, A. J. Bicknell & Co. 1878.

THE VENTILATION AND HEATING OF SCHOOL BUILDINGS.[1]

VENTILATION.

PURE air contains about .04 of one per cent of carbonic acid gas; the vitiated air of close rooms contains from .07 to .2 per cent of this gas, and other impurities in proportion. This increase in the quantity of carbonic acid is due to the breath of the occupants, which contains about 4 per cent thereof. Although this gas is not the only impurity with which the air is vitiated, and not so injurious to health as some other exhalations from the human body, yet, as it is easily

[1] Condensed from the *Educational Monthly*.

obtained by test and is supposed to be generated in about the same ratio as the others, it is taken in chemical analysis as an indication of the various impurities given off into the air by the occupants of a room. It is not well to allow the proportion of carbonic acid in the air to reach more than .07 per cent. When it does become more the impurities will be evident to the senses, and it is essential to health that the ventilation receive attention.

The most accessible test for the impurities in the atmosphere is an active sense of smell. It is true that a person may remain so long in a vitiated atmosphere, or the air may become foul so gradually, that this sense will become inactive and not warn him of the existing condition; but upon reëntering a room after a few minutes spent in the outer or a purer atmosphere, the impurities will be evident if they exist to an injurious extent.

Another easy method of determining whether air contains an injurious amount of impurities is based upon the fact that a certain amount of carbonic acid is necessary to cause a visible precipitate in a certain amount of lime-water. When to a bottle holding 12.58 oz. of air half an ounce of lime-water is added, it will give a precipitate if the air contain .07 per cent of carbonic acid. A bottle holding 10.57 oz. would give a precipitate with the same amount of lime-water, if the air contained .06 per cent. of carbonic acid. A larger bottle and more lime-water could be used if the proportions were preserved. The lime-water should be added by means of a pipette holding the exact quantity. The use of this test, which requires no skilful manipulation or troublesome calculations, might be adopted with advantage in school-rooms.

In some kinds of buildings natural ventilation alone is sufficient to supply the wants of the inmates during the summer months; but for schools, where so many persons are congregated in one room, artificial assistance is needed at all times.

The watery vapors from the lungs of the occupants of a room absorb the various organic impurities with which they come in contact, and when the former are condensed upon the walls and furniture the latter are deposited with it, and remain there after the moisture is evaporated again. The floors, wood-work, furniture, and all other possible parts should be frequently and thoroughly scrubbed and dried, and all unpainted walls and ceilings should be wiped with dry cloths. Old furniture, books, clothing, sweepings, or any kind of rubbish should never be allowed to accumulate anywhere about the building. The yard and entire premises should be kept clean and free from dust and every impurity by which the air may become contaminated.

There are two systems of artificial ventilation: the *vacuum* system, or that of extraction, which by means of heated shafts or chambers draws the air out of an apartment, openings being provided for the admission of fresh air; and the *plenum* system, or that of propulsion, which forces the air into an apartment by means of a fan or other apparatus, and provides openings for the escape of the foul air. The latter system is seldom necessary in the ventilation of buildings. It may be used with advantage in hospitals, and also in mining operations, and in certain manufactories; but in the ventilation of school buildings the vacuum method is altogether the more desirable, being economical and effective.

The supply of twenty cubic feet of fresh air per minute to each of the occupants of a room is sufficient to keep the air pure. In school-rooms fifteen cubic feet[1] per head per minute, in addition to that which is furnished by natural movements of the air, is ordinarily sufficient.

In removing the foul air from an apartment, it should be taken as nearly as possible from where it is generated. It is well to provide openings in or near the floor for its exit. By this plan the air is constantly settling downward over the occupants, taking with it the exhalations from their bodies, and removing at once any odors from the dampness or filth brought in upon their feet. These openings should be of such size as to be depended upon entirely during the winter months; for if outlets were placed near the ceiling, the warmed, fresh air, which finds its way at once to the upper part of the room, would escape without mixing materially with the foul air. During the summer months it would be theoretically correct to place the openings for the exit of the foul air near the ceiling, the cool air coming in near the floor and rising towards the ceiling and taking with it the warm exhalations from the bodies of the occupants. But it is found in practice that with the temperature of the air not far removed from that of the human body it may be drawn in any direction, and with the aid of the natural ventilation afforded in warm weather the exact position of the entrances to the ducts is of little importance. It is well to place them near the floor, on account of the downward tendency of those organic impurities which are held in suspension by the air. A current of air flowing at the rate of one and one half feet per second does not produce an appreciable draft. If the current at the openings for the extraction of the air is not over four times this, there will be little danger of unpleasant drafts toward them.

If the velocity of the current in the duct is six feet per second, and each person needs twenty cubic feet per minute, or one third of a cubic foot per second, there would be needed by each occupant of a room one eighteenth of a duct the cross-section of which measured one square foot. If there were a duct to every ten persons its cross-section should measure eighty square inches. If the current is slower, the ducts should be correspondingly large. It is not best to have the ducts smaller in proportion and the currents correspondingly faster than those spoken of above, as there would be danger of unpleasant drafts toward the openings into them.

The ducts should be lined with tin or iron their entire length, unless they are built in a brick wall, as they may endanger the building from fire. They should lead to an upright shaft extending to the outer air above the roof. This shaft, the capacity of which for extraction depends upon the difference in weight of the air inside and outside of the building, should be of such size that the area of its cross-section will equal three fourths of those of all the ducts emptying into it, if the current in the ducts is about as mentioned above. The ducts should enter the shaft in an upward direction, that the current from them may not be checked by that from below, and should be supplied with dampers, that their currents may be regulated, as ducts from the nearer rooms are inclined to furnish an undue amount of air, which the shaft extracts.

The best shaft consists of a brick stack extending from the ground to above the roof. By applying heat at the bottom of this form of shaft the column of rarefied air will be the whole height of the building. If the entrances of the ducts into the shaft are properly secured from danger, the fire for rarefying the air can be kindled in the shaft, and the smoke-pipe from the heating apparatus may be turned directly into it. If the building is a large one the smoke from the heating apparatus is usually taken to the top of the ventilating shaft in a cast-iron flue; but in a brick stack, with walls of sufficient thickness and properly built, this may be unnecessary. However, it is best, in any case, to extend the smoke-pipe up, after it enters the shaft, to above the entrances of the ducts from the first floor, in order to give the current of smoke the proper direction and the air in the shaft the benefit of the aspirating effect of this rapid current from the furnace. Another method is to brick up a flue for smoke beside the air shaft, building the partition between the two with bricks set on edge, thus making a partition through which sufficient heat passes to aid materially in rarefying the air.

If the shaft and the ducts leading to it are of sufficient size there will be no need for heat during the larger part of the year. In a shaft of good size a current of ten feet per second is common. However, the provisions for heating must in no case be omitted, as the draft is as sure to be downward when the air in the shaft is cooler than that outside as it is to be upward when the opposite condition prevails. During the spring months, it very often happens, in a building that is not constantly occupied, that the walls are colder than the external atmosphere.

Sometimes, as in the remodelling of an old building, a brick shaft is not available. In this case a short shaft can be constructed, extending from the floor of the attic to above the roof, and the flues be all taken to that. It may be heated at its lower part, and some of the ducts may be separately heated by steam-pipes or gas-jets. A shaft built in this manner should equal in its cross-section the combined area of all the ducts emptying into it.

The amount of cubic space required by the occupants of a room is of less consequence than is generally supposed. If there is abundant provision for ventilation, all that is necessary being enough to enable the occupants to keep out of the drafts; and without ventilation, no obtainable amount will be sufficient to keep the air pure through a session of a school. The greatest need of space seems to occur during the summer months. About two hundred cubic feet per person will be enough in the ventilated school-room.

There should be some means provided for the ventilation of the cellar at all times. Its ground air and mould are particularly unwholesome, and if not attended to find their way continually to the rooms above. The cellars can be ventilated by making connection with the main ventilating shaft, or by a separate duct to the open air above the roof. The air should be taken from near the floor. In case there is no cellar the space beneath the lower floor should be ventilated.

HEATING.

It is essential to the health and comfort of the occupants of a room during the colder months that heat be applied in two ways: first, the air should be slightly warmed before it reaches the lungs; and second, the building, that is the walls, ceilings, furniture, etc., should be heated to a degree higher than that of the air. Air receives its heat by contact alone, the radiated heat from any source passing through it without materially increasing its temperature; and it is practicable to warm the walls of a building from the inside without heating the air to the same extent.

Any apparatus for furnishing heat that is not used in conjunction with a plentiful supply of fresh, warmed air is incomplete and unhealthful; and any apparatus that furnishes heated air alone, and does not provide for the direct radiation of heat to the walls, is also unhealthful, unless peculiarly and carefully managed. The reason for this lies in the fact that in order to furnish all the warmth required in an apartment by supplying heated air it must be heated to a degree too hot to be breathed with comfort. Under these conditions (the walls receiving their heat from the air, and consequently remaining always the cooler) the occupants give off too much heat by radiation from the surface of their bodies to the walls, and too little by means of exhalation from their lungs. The use of an ordinary air-tight stove is one example of the improper method of warming

[1] This strikes us as a small allowance. We should rather double it.— Eng. American Architect.

without ventilating, and that where steam radiators placed about a room without connection with an air passage is another. The ordinary hot-air furnace is an apparatus that furnishes air warmed to too high a degree.

Stoves are a very economical kind of apparatus for heating small school buildings, and if properly constructed and managed will warm the incoming air to a healthful degree. A ventilating stove consists of the necessary parts of an ordinary stove, and in addition a metallic casing enclosing a space around the ordinary outer parts. This space, which is open at the top, is connected with the outer air by means of a duct entering it near the bottom. If practicable, the casing is arranged so as to enclose most parts of the stoves except those doors and dampers by means of which the fire is fed and managed. Stoves of this description are manufactured in some parts of this country, and many stoves of ordinary patterns may be made into ventilating stoves by adding the metallic casing. If necessary, this casing may be made to enclose the whole stove, and a large door be provided through which the fire can be reached.

A valve should be provided in the fresh-air duct, by means of which some of the supply from the outer atmosphere can be cut off and a part of the air be taken directly from the room. This will check the exit of the air through the foul-air flues, and that in the room may be warmed to a higher degree. This arrangement can be used with advantage to heat the walls of the room before it is occupied, the cooler air being turned on after the session begins.

The warm-air furnace is like a large ventilating stove set in the basement, the outer casing being of metal or brick. Their action is somewhat similar, but the direct radiant heat from the apparatus is lost to the apartments above. The greatest objection to the furnace lies in the fact that with the usual management the air is admitted at too high a temperature during the sessions of the school.

If a furnace were properly constructed and managed, a current of hot air might be introduced before the sessions begin, and a current of cooler air while the room was occupied. By this method, or if used in connection with stoves situated in the apartment, which furnish radiant heat, the use of the furnace may be healthful. To enable the furnace to supply hot air before the room is occupied a connection could be made from the school-room to the fresh-air duct, so that a current would be established similar to that spoken of in connection with the ventilating stove.

With furnaces, ventilating stoves, or any apparatus to which air is conveyed by means of ducts, the greatest annoyance usually comes from the impurities which collect therein, and being burned or heated by the furnace generate offensive gases. The channels for fresh air should be made so as to receive no part of their supply from the basement, but from that source where its purity can be best secured. They should be so constructed that they can be easily opened and thoroughly cleaned.

The necessary sizes for fresh-air ducts can be estimated by a process similar to that for the foul-air ducts, taking the velocity as found by experience. They are usually too small.

The passage of warmed air to a room through upright passages and ducts forms a means of propulsion which assists the drafts in the foul-air ducts.

For heating large buildings there is no apparatus so complete as a system of steam-pipes and radiators. If they be properly arranged they will furnish radiant heat to the walls and will warm the air to any degree desired. The best way of using steam apparatus in school buildings is to place radiators in different parts of each room, and to provide openings near them from the outer air. By this plan the incoming air is warmed by flowing around the pipes of the radiators, and the walls are warmed by radiated heat. To make this plan complete there should be screens in front of the radiators to protect the scholars from the direct radiated heat and from the currents of incoming air.

F. A. COBURN.

COMPETITION IN INTERIOR DECORATION.

V. THE VESTIBULE OF A CITY HOUSE.

THE subject of the fifth competition will be the interior of the entrance-vestibule of a city house. In plan it will be ten feet by twelve, and it will be fourteen feet high. By day it is to be well lighted by transom or side-lights; and as it must be lighted at night, special attention must be paid to the chandelier, gas-brackets, or other attributes of artificial lighting. Required: A plan showing the arrangement of coat-closets, and the design of the floor-tiling; an elevation looking towards the street, a section, and details to a larger scale. Or instead of this, a plan, a perspective view of the interior and details, will be accepted. Drawings must be received at the office of the *American Architect and Building News* on, or before, August 20.

NOTES AND CLIPPINGS.

THE NOISE OF THE ELEVATED RAILWAYS. — The New York *Evening Post* suggests that a remedy for the annoyance caused by the noise of the elevated railroads may be had by following the example of bee-hunters, who, when they find a honey tree on land whose owner would object to the felling of the tree, gird it tightly about with an ox-chain. This is said to so deaden the sound of blows that a tree may be chopped down unknown to the owner, though within easy ear-shot.

SOME WATER-TESTS FOR LAYMEN. — The need of simple tests for the more deleterious substances to be found in potable water, have been often felt, we doubt not, by many of our readers. The presence of a few undesirable salts and acids are discoverable by simple means. Among these are the nitrates, nitrites, chlorates, and chlorides. Ammonia can be easily detected, if in excess. The presence of nitrates shows that organic matter has been acted upon, and may be present. The salts are not dangerous; the danger lies in their source, and this should, if possible, be ascertained. The presence of a nitrate may be readily detected by the following reaction: Place a small quantity of the water to be tested in a test tube; add an equal quantity of pure sulphuric acid, using care so that the fluids shall not mix; to this add carefully a few drops of a saturated solution of ferrous sulphate (sulphate of iron). The stratum where the two fluids meet will, if nitric acid be present, show a purple, afterwards a brown color. If the nitric acid be in minute quantities, a reddish color will result. The presence of ammonia, if in excess, can be determined by treating the water with a small quantity of potassic hydrate. Ammonia, if present, will be liberated and may be recognized by its odor, or by the white fumes of ammonic chloride when a glass-rod wet with hydrochloric acid is passed over the mouth of the test tube. Why chlorine is present in any form in water used for drinking should always be ascertained. In itself, its presence is evidence that sewage contamination in some form exists. The presence and amount of chlorine may be ascertained by the following simple method: Take 9 grains of argentic nitrate (nitrate of silver), chemically pure, and dissolve it in 200 cubic of distilled water. (We have found the cubic centimeter to be a very convenient unit, perhaps the best.) One cubic of the solution will represent 1-100th of a grain of chlorine. Take a small measured quantity of the water to be examined, and put it into a glass vessel so that the reaction may be readily observed. The vessel should be more than large enough to hold the water. Add to the water a *small* quantity of the solution; if chlorine be present, a white precipitate will result. Repeat the addition, after short intervals, until no precipitate results. The analysis is then complete, and the units of the solution used will determine the hundredths of a grain of chlorine present. If more than a grain of chlorine in a gallon be present, reject the water, unless it can be clearly determined that the excess does not come from sewage. The water should be slightly acidulated with nitric acid before the test is applied.

We will conclude by recommending Heisch's sugar test for the presence of dangerous organic matter. It is mentioned by high authority as a simple and sufficient test: Place a quantity of the water in a clean, glass-stoppered bottle; add a few grains of pure sugar and expose to the light in the window of a warm room. If the water becomes turbid even after exposure for a week, reject it. If it remains clear it is safe. — *Engineering News.*

A NEW MAMMOTH CAVE. — At Glasgow, Ky., a cave has been discovered within a short time which will probably outrival the famous Mammoth Cave of the same State. It has been explored for a distance of twenty-three miles in one direction and sixteen in another. The avenues are so wide and the bed so good that a span of horses can be driven through them for a distance of eleven miles. Three rivers flow through it by different channels; one of them is navigable for a length of fourteen miles. Aside from the natural interest attaching to the discovery of such a place, the discovery promises to be of some ethnographical importance, for in one of the large chambers of the cave were found several mummies, which were enclosed in rude stone coffins. It is said that they are not dissimilar in appearance to Egyptian mummies. The cave has been named the Grand Crystal Cave.

A NEW THEORY REGARDING MUMMIES. — Having observed that Egyptian mummies could be divided into two classes, one embracing those bodies which had been embalmed intact, and the other including those bodies which had been eviscerated, Dr. Gausebach, a Swedish chemist of repute and professor in the University of Upsal, has formed the opinion that the mummies of the first class are not really dead, but are only in a condition of suspended animation; though, unfortunately for historians, the secret of bringing them again to life has been lost. In support of this theory he adduces the results of his own researches and experiments, one of which consists in submitting a snake to a process, the details of which are of course kept secret, which petrifies it. In this condition it has been laid aside for a year or two at a time, and is then restored to life by some equally mysterious vivifying process. This has now been during a space of fifteen years, and the snake does not seem to dislike it. Dr. Gausebach is said to have applied to the Swedish Government for leave to experiment on a condemned criminal, the understanding being that if the experiment is successful the criminal shall receive pardon, because of the service thus rendered to science, and, possibly, to humanity.

MAKING CEMENT FROM SEWAGE. — The London *Pall Mall Gazette* says: "Among the many devices for the utilization of sewage that of converting it into cement is not the least curious, and it has actually been put into practice at Burnley. The town sewage runs into settling tanks, being mixed on the way with 'lime cream.' After settling, the sludge is dried, and finally packed in kilns and burned, no other fuel being necessary than just sufficient coal and shavings to set it alight. 'Cement clinkers' are the result; and these ground into coarse powder make the cement, which is salable as Portland or other hydraulic cement. Either Portland or Roman cement, or agricultural lime, is produced according to the quantity of lime employed. The corporation of Burnley are said to be satisfied with the purification thus effected of the sewage, and the company working the invention (General Scott's Cement Process) find it profitable. The system is alleged to be applicable to London."

THE INDIANA HOSPITAL FOR THE INSANE. — The new Indiana Hospital for the Insane, which is about ready for the reception of inmates, contains 20,000,000 bricks, 80,000 panes of glass, and 400,000 square feet of flooring, the outside line of the walls being one and one eighth mile in length. The building's estimated cost was $550,000, but it will be completed for $650,000. The architect is Mr. Edwin May, the same who is to build the new State House.

A New Fire-Proof Floor.—A test of a fire-resisting flooring was on Thursday week made in Victoria Street, Westminster, for the information of the Metropolitan Board of Works. The Board has the power to refuse leave to architects to erect buildings of greater height than 100 ft., and objection was made to the block called the "Members' Buildings" in Victoria Street, on the score of the insecurity of life in case of fire. The objection was met by the provision of fire-resisting floors, and to prove that the means taken were secure was the purpose of Thursday's experiment. A square building with 9-inch brick walls had been erected on the open space to the west of the Westminster Palace Hotel, the building representing the floor of a house with windows, doors, and a corridor. A room in this building contained the materials for a fire carefully laid, many timbers being so placed as readily to catch in flame, and shavings being heaped round the apartment. The material was then fired, and as there was a through draught from window to door a fierce fire soon raged. The flooring to be tested formed the roof of the building, consisting of ordinary wooden joists, cased with terra-cotta tiles, and there are in the eyebrow three open spaces between the ceiling of the one room and the flooring of the room above, the room above in the experimental room being, of course, open. While the fire was raging in the room and throwing out an intense heat, the gentlemen witnessing the experiment walked above the lighted room, and proved, by the application of the hand to the topmost terra-cotta tiles, that the heat had not penetrated, though the fire had burnt for upwards of an hour. Mr. Vulliamy, the architect of the Metropolitan Board of Works, expressed himself quite satisfied with the experiment, and considered that buildings protected with this flooring would cause fires to be limited to the room in which they commenced. Mr. Francis Butler is the inventor. The invention is said to be inexpensive, costing about 50 s. for 100 ft. square.—*The Building News.*

Steel Bronze.—The London *News* says that the Austrian gun-makers seem to be able to make bronze as hard as steel, and as capable of resisting the wear and tear of rifled projectiles, since it would be altogether impossible to pierce armor plates with a bronze gun made in the ordinary way. If we are to believe the last reports of their big gun experiments, the bore of the weapons after some three hundred rounds had sustained no injury at all, notwithstanding that comparatively heavy projectiles were fired, and with battering charges of gunpowder. But the most surprising feature about the Uchatius gun is the fact of its secret having been so closely kept. The Austrian Government has placed no difficulty in the way of an inspection of its guns, and has permitted even the presence of foreign military attachés in the government work-shops. Nay, more, samples of the wonderful steel-bronze metal have been freely distributed, and chemists have tried their best to discover its mode of preparation by analysis. All has been in vain. Despite fair means and foul, the secret of the Uchatius metal still remains a mystery, and bids fair to be so, until its inventor divulges the composition himself.

Prison Bars.—The *Scientific American* says that a recent patent by a Western jail-builder consists in using steel bars with a wrought-iron core, and after cutting them to desired lengths and drilling them, heating them to a red heat and immersing them in water, while tightly held in clamps of the exact size, so as to render the edges of the bars as hard as flint, perfectly resisting the file or chisel, and impossible to be broken on account of the iron core. The clamp holds the bar so that warping is prevented.

The Motive Power of Niagara Falls.—We have mentioned (*American Architect* for May 5, 1877) the suggestion of Dr. Siemens, that the Falls of Niagara could be turned to practical use for manufacturing purposes, by causing the stream to work dynamo-electrical machines, which could transmit the force to towns at a distance. The *Buffalo Commercial* now states that a company has been formed who are going to use the Fall to make compressed air, which is to be the means of transmitting motion to a distance. In this scheme the canal built by Mr. Day at a cost of about a million dollars will play an important part. "It is 83 feet wide by 11 feet deep, and leads from a point just above the rapids a mile across to the back below. At its lower end is a large basin 70 feet wide and 800 feet long and 11 feet in depth. From the basin a flume 300 feet long is digging to the edge of the precipice. At the mouth of the flume will be a massive iron gate with an 8-foot opening. The water from the flume will pass into the reservoir, which will be connected with the air receptacles below (iron cylinders 8 feet in diameter and 70 feet long) by means of large pipes siphon-shaped. Attached to the cylinders will be a requisite number of large automatic valves, to let the water run out of the cylinders after the compressed air has been allowed to escape. The practical working of the machinery will be briefly as follows: After the water in the reservoir on the top of the bank is high enough to reach the bend of the siphon it will escape down the pipe to the air cylinders below. The pressure thus obtained very soon closes the automatic valves. There being no escape for the water which continues to pour into the cylinder (each has its own feeder), the air which it contains is compressed by the volume of water from above, until it has as much expansive power when released as steam. The capacity of the reservoir and of the cylinders is so arranged that the reservoir will be exhausted by the time the desired compression has been obtained below. While the reservoir is again filling with water, that in the cylinder is escaping, so that when the bend in the siphon is reached the contents of the cylinder is exhausted, and it is ready for another charge. Thus the operation is repeated at regular intervals in each cylinder, and there being several of them, a continuous charge of highly compressed air is secured."

Utilizing the Electric Light.—The intensity of the shadows caused by the electric light is one of the great disadvantages which prevent its introduction into general use. A French woollen manufacturer has successfully lighted his spinning-room, which measures 140 feet by 85 feet, by placing two electric lights at a height of six feet from the floor, and projecting their light upon white-washed walls and ceiling by means of conical reflectors, which are so arranged that the room is lighted by reflected light alone.

The Sutro Tunnel.—For some time past heavy blasts in the header of the Sutro tunnel have loosened blocks of rock weighing as much as a ton from the drift from which the Savage Company is running to connect with the tunnel. The men in the Savage have been withdrawn from the face to the drift. The tunnel is believed not to be further away than eighty feet, and it may be that connection will be made by the Fourth of July.

A Salt Mine.—A mine of pure rock salt has been discovered at Wyoming, N. Y., 1,200 feet beneath the surface. It was discovered while sinking an oil well. The stratum is said to be 100 feet thick. There are but few extensive mines of pure salt in the world. There is one in Valencia, one in Poland, and one in Armenia, near Mount Ararat.

The Cost of Fencing.—According to United States statistics, worm or Virginia fence costs 95 cents, post and rail $1.35, board fence $1.26, and stone wall $2.34 per rod. This estimate is based upon boards at $16 per thousand and rails at $5. From the same source it would seem that of one fences 63 per cent are of the kind known as worm or snake fence, 17 per cent of post rail, 12 per cent of board, and only 4 per cent of permanent stone wall. The returns embrace 158,877,721 rods of fence, enclosing 16,374,641 acres, at a cost of $179,834,493, or at the rate of 955 rods to each 100 acres. Each dollar's worth of live-stock requires one dollar's worth of fence to keep it in bounds.

Powerful Engines.—In the United States steamer Wampanoag, possibly the fastest steamer afloat, are a pair of "hundred inch" engines, each of which is said to be six times as powerful as the great Corliss engine, which was one of the mechanical wonders of the Centennial Exhibition. These engines were built about fourteen years ago together with six others, one pair of which, built at a cost of $250,000, has never been placed in a vessel, but still lies at the Washington navy-yard.

Chemical Process for covering Zinc with the most Brilliantly-colored Coatings.—The articles of zinc are first brightened by vigorous scouring with quartz sand, moistened with dilute muriatic acid, passing them quickly in water and then wiping dry most carefully with white blotting-paper. To insure success, however, it is necessary to employ zinc as free as possible from lead, and to have it bright like a mirror. When these conditions are fulfilled, the metal may be coated with a variety of most beautiful colors by immersion in a solution of alkaline tartrate of copper for a shorter or longer interval of time, depending on the color that is desired. The solution is made by dissolving three parts of air dried tartrate of copper in caustic soda lye containing four parts of hydrate of soda to forty-eight parts of water. If the zinc is dipped in that liquid at a temperature of 10° C. (=50° Fahr.), it appears violet after two minutes, takes a splendid dark-brown in three minutes, changes to green in four and a half, to golden-yellow in six and a half, and to purple in eight and a half minutes. If the liquid be employed at another temperature than that given above, the appearance of the different colors will also vary in other short periods of time. If the zinc be left longer than eight and a half minutes in the copper liquid at 10° C., the last-mentioned purple color disappears, being replaced by one or another of the preceding hues, depending on the time; but then they are never of the same brilliancy, and will continually diminish, until after some days' immersion the zinc is covered with a miscolored suboxide of copper. For this reason the articles are removed from the bath as soon as the desired color is fairly developed, and rinsed immediately in water. After careful drying, the metal may be coated with a good varnish, to make the colors more durable.—*Engineering and Mining Journal.*

What becomes of the Gravestones.—The correspondent of the *Sheffield Independent* says it has often been regarded as a mystery what becomes of all the pins that are manufactured, but it has puzzled him scarcely less to know what becomes of all the gravestones erected during past years over the remains of departed relatives. Recently he came upon a clew likely to solve the mystery. He was in a remote Derbyshire village which has an old church and a very well filled churchyard. The late rector was both squire and parson, and as squire he owned some farms. What did he pave his farmyards and farm buildings with? With gravestones; and so little was he ashamed of the process, that the stones were laid with the inscriptions upwards, telling their own tale. Take another example. A somewhat famous Derbyshire church, lying about seven miles eastward from Chesterfield, has lately been undergoing the process usually known as "restoration;" that is to say, things have been pretty well knocked about. The work is now approaching completion. Indeed, the workmen are engaged in laying down the floor. The aisles are being paved with stone obtained, you say, from some quarry famous for its flagstones? Not at all. There is an illegitimate quarry nearer at hand with stones already worked. The churchyard is being resorted to, and gravestones are pulled down, cut into convenient sizes, and laid down in the aisles.

Michelet's Tomb.—The monument to Michelet will soon be erected, almost $5,000 having been subscribed for the purpose. It will represent the historian lying on his tomb. The Muse of History, rising to Heaven, writes on the stone, "History is a Resurrection." From the pedestal of the monument is to spring the fountain which is to keep ever fresh the flowers with which Michelet asked his tomb to be covered.

The Largest Cask.—The largest cask in the world is that at Königstein, which was finished in 1725 after three years' work. This cask, as soon as finished, was filled with 6,000 quintals of good Meissen wine, which cost £6,000 sterling. It contains 649 hogsheads more than the famous tun of Heidelberg. The top is railed in, and affords room sufficient for fifteen or twenty persons to stand.

A Monument to Victor Emmanuel.—King Humbert has set apart $200,000 out of the income of his civil list towards the monument to his father to be raised in Turin.

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CONTENTS.

SUMMARY:—
A National Polytechnic School; Its Advantages; Its Disadvantages.—A Case of Architectural Enterprise and What came of It.—Politics in the Department of Architecture.—Copyright in Works of Art.—A Strange Demand on the Part of the Royal Institute of British Architects 9
PREMIUMS IN COMPETITIONS 10
MODERN PLUMBING. V. 11
THE ILLUSTRATIONS:—
The Rathhaus at Rothenburg.—Designs for Furniture.—Block of Three Houses near Cincinnati, O. 13
THE ENGLISH NATIONAL WATER-SUPPLY 13
IRON AS A BUILDING MATERIAL 14
CORRESPONDENCE:—
Letter from New York 15
COMMUNICATION:—
A Question in Pyronomics 16
NOTES AND CLIPPINGS 16

THE scheme of Dr. R. P. Dyrenfurth for a National Polytechnic School, as recommended in the speech of the Hon. Henry Blair, of New Hampshire, in the House of Representatives, on the 18th of June, contemplates the establishment of a great central institution of instruction in science and the useful arts, supported by the surplus income of the Patent Office, which amounts to $100,000 annually. The accumulation of this unappropriated balance during many years now amounts, we are informed, to a fund of $1,200,000. It seems proper that this considerable fund and income should be applied in some way to benefit the national spirit of useful invention, whether by promoting scientific investigation or by feeding and enriching the sources of the industrial arts through processes of education. The plan in question was submitted in the last days of the session without any expectation of immediate action, but with the intention of awakening profitable discussion of the subject. It provides for schools of mathematics, of civil and mining engineering, of machinery, architecture, chemistry, agriculture, and forestry, with a Board of Regents, composed of the Vice-President of the United States, who is to be the chief executive officer, of the Secretary of the Interior, who is to be *ex-officio* Director, of the Commissioner of Patents, and of six members each of the Senate and House of Representatives. It is proposed that each of the eight schools shall have a principal, that the students shall be appointed in the same manner as are those of the Military and Naval Academies, that they shall pay $250 per annum for tuition, board, and lodging, with certain fees for practice in the laboratory, etc., shall wear a uniform and be subject to such discipline as shall most effectually increase the efficiency and maintain the authority of the school.

IN behalf of this scheme it is claimed that it contemplates no expense to the national treasury; that it will be free from political influences; that, by the equal territorial distribution of polytechnic graduates, it will fairly diffuse the benefits of scientific education; that these graduates will stimulate healthy enterprise and useful invention, and afford a sound basis for the advancement of all the practical arts of civilization; that the proposed school will enjoy the advantage of proximity to examples of the best mechanical inventions in the model rooms of the Patent Office; that, by the method of appointing its pupils, it will not interfere with existing institutions; and that, by the nominal cost of their instruction, it will open the benefits of scientific training to many who are now practically excluded from them.

AS yet this proposition has attracted but little public attention, but it deserves to be fully discussed. Its merits are obvious enough; the greatest of them, perhaps, is, that it points out the fact of the existence of a great available fund eminently fit for the endowment of technical education. As for the especial contrivances of Dr. Dyrenfurth, by which he would divert this newly-discovered treasure to its natural uses, we commend them to the careful consideration of our readers. As at present advised, we are not of those who consider the establishment of centralized institutions of instruction best adapted to our needs. Naturally the same arguments brought against a national university must apply to a national school of science. The Naval Academy at Annapolis, and the Military Academy at West Point are maintained for the education of officers in the public service. They occupy a place which no private or local institutions could possibly fill, and are necessarily based upon arbitrary standards of discipline, so that their graduates may conform to a type and become parts of an elaborate machine, the efficiency of which largely depends upon the subordination of the individual to the system. The object of a polytechnic school, or a school of technology, on the other hand, is to develop individual and independent minds for the various uses of civil life; the primary aim is through the individual to improve the arts of civilization. To this end numerous technical schools have been provided in various parts of the country, each of them requiring, for the perfection of its use, more complete apparatus of every kind, a larger and better paid body of instructors, larger loan funds, more numerous scholarships, and, in short, a more ample endowment than any of them at present enjoy. These institutions are distributed according to the enterprise and needs of the commonwealths, and to meet natural demands. It would seem, therefore, that the large surplus funds of such an institution as the Patent Office would be more usefully and economically applied by distribution, under proper restrictions, among these various naturally established nuclei, than by adding yet another nucleus, and one which, from the nature of the case, must be subjected, like the present national schools of the military arts, to the annual chances of imperfect and meddlesome legislation. Let us, however, thank Dr. Dyrenfurth for drawing our attention to these unexpected national resources, and let us hope that his ingenious scheme may in the end result, by whatever means, in giving to technical education in this country the most effective and the most judicious assistance.

WE desire to give our readers the benefit of an invention in architectural practice which, while it may possibly suggest to the more energetic members of the profession the existence of new and untried fields of remunerative if not honorable employment, may also admonish them that such fields, however promising, are sometimes fertile only in brambles. The erection of a new county jail has for some time been contemplated by the Board of Supervisors of the city of Brooklyn. Most of the profession, even in these hard times, would content themselves with awaiting at the Board-room doors until the assembled wisdom within should have finally determined to build the jail, when the usual professional swoop and scramble for the spoils would have been witnessed; but Mr. Wm. A. Mundell with superior enterprise, volunteered to assist the Board by laying before them a full set of plans for the building in question, which plans of course were not to be paid for if the scheme of building came to naught. The Board, being human, could not but assent to a proposition so easy as this and accompanied with such a saving clause, and the plans in due time were unrolled upon the table before them. The real building, however, is apparently not foreshadowed by these drawings and a full fledged claim forthwith comes into existence, which on the 1st instant was laid before the Board in a motion to pay said Mundell the sum of $4,500 "out of the unexpended balance of the out-door relief account," for his plans and specifications for the new jail, as payment in full for his services, he to deliver all such plans and specifications to the clerk of the Board and to agree, if at any time it should be desired to begin the erection of a new jail, that he should superintend the work for the sum of two and one half per cent on the cost thereof. It is to be supposed that Mr. Mundell, for the sake of the public interests involved, was willing to sacrifice himself in this manner, for the motion was adopted by the Board and the architect departed with a feeling that he had by his clever professional management benefitted himself, if not the county. But the next day the Taxpayers' Association obtained from the city court an injunction forbidding the payment or the receiving of the check for $4,500 for the services in question, and now Mr. Mundell has only his plans and the sympathy of his friends in the majority of the Board with which to console himself.

ALTHOUGH, apparently, the testimony before the Potter committee has so far failed to meet the expectations of its friends, it certainly has succeeded in opening to public view some of the

curious hidden machinery of politics, in showing how widely extended are its wires and in what odd places the party-puppets jump. The latest exhibition of this kind occurred in the Department of Architecture, where it might be supposed those only who could manage a T-square or superintend a piece of mechanical work would find place. One Mr. Dennis was lately compelled to narrate before the committee his adventures in search of an office in reward for certain alleged political services in Florida. It appears that he aspired first to be an auditor in the Treasury Department, then to be a special agent, and then to be custodian of plates and dies, but, failing in these efforts, he finally applied for and obtained a place in the Department of Architecture, where, although, as he confessed, he knew nothing of architecture and of course had passed no examination, he discovered a congenial function for drawing pay without any equivalent of service; so that when he asked for a leave of absence of three or four months to go to Massachusetts, he was enabled to say to the Assistant Secretary of the Treasury that he "was put on there to draw pay," and would not lose his "capacity to do so" if he went away. We regret to say, for the credit of the Administration and notwithstanding its pledges of civil service reform, that, according to his testimony, he got his leave and drew his pay regularly at the rate of six or seven dollars a day. We are much exercised to know with what show of occupation the Supervising Architect supplies those who hold these decorative positions in his Department. Architecture is said to be the reconciliation of the useful with the beautiful. Is this reconciliation exemplified in the government office, and do the working draughtsmen there manage to maintain a symmetrical and entirely operative union with their purely ornamental comrades? An explanation in his next annual report how in architecture "they also serve who only stand and wait," may afford some useful hints to the profession and would be thankfully received.

A commission, appointed by the crown in England, to investigate the copyright laws, and to suggest new enactments by which the rights of the public and of authors, publishers, painters, sculptors, architects, and of all intellectual producers, should be more distinctly defined and more properly adjusted, has just made its report. After an elaborate investigation, the commission concludes, as regards paintings, that, in the absence of a written agreement to the contrary, the copyright in a picture should belong to the purchaser, or the person for whom it is painted, and should follow the ownership of a picture, without, however, prejudicing the right of the artist to make such use of his preliminary studies and sketches for such picture as shall result in works which are not direct imitations or *replicas* of it. Mr. Charles Barry, on behalf of the Royal Institute of British Architects, appeared before the commission, and claimed that architects were subjected to great injustice and injury by the absence of a copyright which should protect their designs and prevent their use by other persons than the authors for building purposes. He suggested that the right to reproduce a building, whether in whole or in part, or on a different scale, or for other persons than the original client, should be reserved to the architect for twenty years from the date of erection, or from the sale of the design. The commission, however, considered it impracticable to reserve this right to the architects to reproduce buildings, but recommended that property in architectural designs should be protected as drawings, "so that they may not be copied on paper."

It follows from this apparently that, in the judgment of the commissioners, among whom, by the by, there was neither a painter nor an architect, the execution of a design in a building is practically, on the part of the architect, a surrender of all right to it in the future to the public; it becomes common property as a work of art, and may be imitated to any extent by any builder, just, indeed, as he himself consciously or unconsciously, in whole or in part, has imitated, or, at least, has been influenced by the works of his predecessors or contemporaries. This is certainly a reasonable condition. If it were practicable to reserve to the architect for twenty years the exclusive right to reproduce his buildings, in whole or in part, as proposed by the representative of the British Institute, the law, as it seems to us, would operate directly to check the natural advancement of the art, and the free development of style, and introduce into design a deleterious element of agressive personality, a sort of patent system, entirely inconsistent with healthy artistic work. It would be the business of every architect to strive mainly for individuality or originality of expression in his work, and studiously to avoid, so far as he could, any appearance of copying, or of being influenced by the works of his brethren, — certainly the lowest motive which can actuate the artist in the process of designing, and one which would make modern architecture even more self-conscious and affected than it is. To place any such arbitrary check upon the laudable tendency to imitate a good work of architecture or to copy the good points thereof, as is proposed by the Institute, would be a direct interference with a natural law of progress. Architecture can live and grow only in a generous atmosphere. The enforcement of such patent rights, if enforcement were possible, would stifle the art and style would disappear in a generation.

PREMIUMS IN COMPETITIONS.

The invitation issued by the Government for a competition for the restoration of the Patent Office calls to mind a usage of competitions, which is at the same time one of the most universal and one of the least reasonable of them all, — we mean the habit of offering graduated premiums for competitive designs. It is, perhaps, not one of the vital points in the management of competitions, yet it seems as if building committees or even architects scarce ever imagined a competition without attaching to it this perverse notion, — for such it appears to us, yet it has nothing better than habit to recommend it, and many things to discredit it. It is probably a survival of the custom of giving a first, second, and third prize and so on, in public games, or school examinations, natural enough, but is transferred to a rivalry in which any gradation among the unsuccessful competitors is as much out of place as it would be among the disappointed suitors for the hand of a princess. In the present case there is no reason to complain of the action of the Government which, having at its command only the six hundred dollars allowed for the purpose by Congress, followed the usual custom by offering it in three prizes, of three hundred, two hundred, and one hundred dollars, and then, when the architects protested that the prizes were too small, did what it could to make the stake more valuable by rolling them into one. It is the prevailing custom that is at fault, as we think, simply because the matter has never been sufficiently considered to set it right, and for this architects are as responsible as anybody.

The objection to a graduation of premiums is, that it gives a wrong turn to competitions, and, while it does not advance their legitimate end, it aggravates their peculiar evils. The purpose of all competitions is, to get the best choice of designs for particular works. The inducements to architects are, first, the hope of getting work to do, and second, a greater or less opportunity to make known their names and capabilities. The disadvantages of them — and they are so serious that a great many thoughtful architects condemn competitions altogether because of them — are, that they demand a great amount of unrecompensed labor; that they are apt to be decided by incompetent persons or committees, and therefore not according to the real merits of the designs; that therefore they are as much a matter of chance as a lottery; that they allure architects by an excitement like that of gambling, and lead to a great amount of trickery, partizanship, ill-feeling, and recrimination. It is important, if competitions are to continue, that they should secure their object as directly and with as little of these disadvantages as possible.

Now the one prize in any competition, the only thing that to an architect of assured position is worth the effort of competing, is the execution of the work itself. There are also the advantages, to those whose position is not yet assured, of the opportunity to attract attention and to make their names known by even an unaccepted design. The premiums offered are never, unless in very extraordinary cases, an equivalent for the work that is rendered by the competitors. It is desirable that committees should be disabused of the idea that they offer any thing, except the work they have to give, which is an equivalent for the labor they demand. No architect in successful practice would think of giving designs for the premiums which are ordinarily offered in competitions were it not for the chance of getting the work for which he competes. The nominal honor of being classed as second or third or fourth in a general competition may naturally appeal to school children, but is worthless to professional men who respect their own position. That a committee, after having obtained what they want and selected a design, should go on to assign an order of merit to the archi-

tects whom they have decided not to employ, is at least gratuitous; if, as is almost always the case, they are technically uninformed, it would be considered an unwarrantable assumption if it were not sanctioned by habit. As a matter of fact the classification of premiums does not command the respect of competitors. The only effect of it is to add a little excitement by the chance of one's getting a little better premium than some one else, which, as far as it goes, is simply unwholesome. Neither the rather childish gratification of being rated above the next competitor by a doubtful authority, nor the pecuniary advantage of having one's small remuneration increased at the expense of his fellow's, is a worthy object of professional ambition.

What, then, is the use of the premiums? An ideal competition would give the work to the best man and pay the rest, all alike, a fair remuneration for their labor. This is sometimes attempted in restricted competitions, but as a general rule it is not to be looked for. The next best thing is, while securing what is thought the best design, to demand as little unremunerated labor as possible, that is, to pay for as much of it as possible. Since there is a regular and uniform fee for architectural work, it may be assumed that the work of the competitors should be paid alike. Whatever money is afforded in premiums might therefore be fairly divided in equal shares among the unsuccessful competitors, the successful one being employed in the ordinary way. But this would in most cases make the sums ridiculously disproportionate to the work done, and so small as to be hardly worth having. Competitors would prefer the chances of a substantial fee to the certainty of a trivial one. The other alternative, then, is to divide the whole amount into equal shares large enough to bear some proportion to the work submitted, and if possible to at least prevent those who receive them from being out of pocket by the competition. The adjustment of these sums would be a matter for judgment in each case. They might be assigned by lot among the disappointed ones, but no one would object to a committee's natural desire to award them, with this limitation, to the designs they preferred. An equal division of premiums seems to us to be the only one which does not belie the true idea of a professional competition; to adopt it would be at least to lessen the aleatory element which is the bane of all honest competitions.

From the point of view of a committeeman we should say that equal premiums were much to be commended. Few judicial positions are more difficult and more thankless than his. By undertaking to decide competitions at all he too often exposes himself to solicitation and recrimination, as well as to error. He cannot avoid the responsibility of choosing a design, nor can he hope to secure good competitors without premiums; but he would do well to spare himself extra labor and responsibility. It is no part of his duty to assign rank to disappointed competitors, and any graduation of premiums is to him an added risk. He must take the risk of selection; but to assume in addition that of classification is simply to invite superfluous opportunities of blundering and of exciting ill-will.

It is the care of architects in this as in other things, to encourage right views of their professional relations. They may properly let it be understood that, if they compete, their competitions are for practice and not for precedence. They want first the natural prizes of their profession, — work to do, and a reasonable recognition of it, — and then to throw away as little unrecompensed labor as possible.

MODERN PLUMBING. V.

WASH-BASINS.

To take up now the particular forms of plumbing apparatus, we will begin with that most universally used, the most delightful when clean and sweet, and the most dangerous when foul or improperly put in, — the set wash-bowl.

Perhaps this is the distinctive luxury of the Northern States in the way of household appliances. There are thousands of modest dwellings, destitute of any other plumbing work, which display their one set basin, either in the best chamber, or, not unfrequently, in the parlor, for greater effect upon visitors; and Americans generally of all classes take great pleasure in marble slabs and running water. There is something touching in this universal love of cleanliness to those who have learned how heavy is the price at which it is gratified; but it can no longer be denied that plumbing work in living or sleeping rooms, especially cheap plumbing work, in the majority of cases, contributes toward shortening the lives, or at least diminishing the health and happiness of the occupants.

As set wash-basins, from being usually placed in or near sleeping rooms, are the source of more evils than any other plumbing appliances, and as from the smallness of their traps these are peculiarly subject to siphonage, we will take occasion, in describing the different varieties of bowls, to explain the principles on which the system of waste-pipes within the walls of a house should be arranged. The same principles apply also to the drainage of sinks, baths, or other apparatus, but as the evil effects of neglect of them will appear soonest, and with the worst consequences, through the medium of the basins, it will be well to enforce them thus early and in this connection.

Our ordinary wash-bowl apparatus consists of a marbled earthenware bowl, fourteen, fifteen, or sixteen inches in outside diameter, with a brass socket and strainer cemented into the bottom, secured beneath a marble slab by three clamps, and the joint filled with plaster of Paris. The waste-pipe, usually one and a quarter or one and a half inch, is secured to the outlet of the socket by a brass coupling, and the upper part of the bowl is pierced with ten or twelve small holes, opening into a short earthenware tube or "horn" attached to the bowl, which is inserted into a lead pipe communicating with the waste pipe below, and this joint is filled with putty. This serves as an overflow. Hot and cold water cocks are fixed into the marble by a screw passing through it and a nut below, and the lower part of the screw, when the cocks are fixed, is furnished with a coupling for the attachment of the lead supply pipes.

To hold the water in the bowl there is a plug of earthenware, brass, or rubber, as the case may be, fitting the socket, and a chain to pull it up, fastened to a chain-stay bolted down to the marble. All the visible metal is silver or nickel plated. The supply pipes are generally one half inch, and the cocks three eighths or one half inch. The stoneware or brass plug is perhaps more durable than rubber, and to save annoyance should be attached by a safety chain, each link of which is in one piece, so that it cannot be separated except by a force sufficient to tear asunder the metal.

A little beneath the bowl the waste and overflow pipes join, and run together to the S-trap, which is apt to be inconveniently placed under the floor. The trap, in the old practice, was often larger than the waste-pipe, but is now made of the same, or even smaller, diameter.

The defects of this arrangement are many and great. Referring to Fig. 1, it is evident that any sewer-gas which returns past the trap will enter the room immediately, if not through the waste, which may be stopped by the plug, through the overflow, which remains always open; and it is certain that an S-trap without ventilation, which not one in a thousand has, is very permeable to the vapors of the drain. Even if the S-trap remained full of water, the pressure of gas in the soil-pipe, which occurs if the pipe is not open at the top whenever the tide rises in the sewers, or a heavy rain fills them, or when hot water is poured down, and in any soil-pipe, ventilated or not, if a considerable quantity of water is poured in at the top, will force a stream of bubbles through the trapping water; even without any pressure the vapor on the drain side of the trap will be slowly transmitted through the water to diffuse itself in the room. But in practice an S-trap in an unventilated drain-pipe is rarely full of water, and in very many cases it never retains water enough to seal the outlet at all. An instructive experiment may be made by cutting holes in an S-trap under an ordinary basin, and inserting pieces of glass, making the joints water-tight. If the basin is partly filled with water, and the plug drawn, the water will be seen to descend to the trap, and after some bubbling the whole body passes around the bend, as if drawn by suction beyond. After a moment the sucking force relaxes, and we see a little water run back into the bend of the trap, more or less according to the length of the the waste-pipe or other circumstances, but rarely more than just enough to touch the top of the bend, and very often not enough even for that, so that a free though perhaps narrow passage is left for air to pass from the drain to the overflow of the basin. Whether the quantity of water discharged is large or small, the result is about the same.

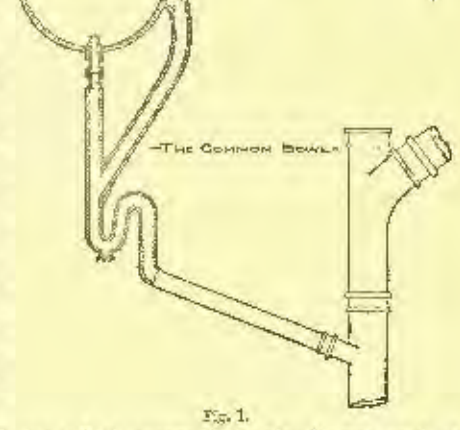


Fig. 1.

Fig. 2 shows the theoretical condition of the water in an unventilated basin trap after discharge. Fig. 3 shows the actual condition under favorable circumstances, and Fig. 4 the actual condition in a very great number of cases.

If the air in the pipe beyond the trap should be rarefied by the passage of a large body of water down the soil-pipe, or by the lowering of the total volume of water in the sewer, the trapping water, as soon as the difference of barometric pressure becomes sufficient to overcome its weight, will all vanish, as if by magic, leaving the trap dry.

This unsealing by rarefaction of the air below, as well as by siphonage, and the forcing of the trap by pressure, may be prevented by ventilation of the trap; but ventilation will only hasten evaporation, which will soon unseal any ordinary water-trap, again leaving the way free for gas to enter the room. This is especially to be feared in city houses left closed for the summer. The basin traps soon lose what little protection they ever had, and foul air pours un-

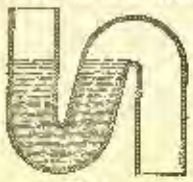


Fig. 2.

Fig. 3.

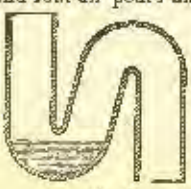


Fig. 4.

checked into the room, saturating the carpets and curtains so that no airing will restore their freshness. All city houses left vacant in the summer, and country houses left in the winter, should have the plugs or waste valves tightly closed, and paper pasted over all the overflows; and any basin, bath, or sink left unused should have water run through it at least once a week, if it is not sealed up altogether. Some plumbers put a stop-cock on the waste-pipe, below the junction of the overflow, to be shut off when the house or room is uninhabited. This is a thorough protection and easily applied.

With so many causes of failure, it is not surprising that there are few wash basins which do not sometimes form inlets for sewer gas.

An evidence of the uncertainty of S-traps is found in the popularity of the Wellington wash-bowl (Fig. 5), which consists of an outer and inner shell, the lower edge of the outer shell projecting downward so as to dip below the surface of a cup filled with water, which overflows into the waste-pipe. The overflow of the basin takes place over the edge of the inner shell. Both the overflow and outlet are thus trapped by the slight dip of the outer shell into the cup-shaped head of the waste-pipe, and this feeble trap, which is not liable to be siphoned out, although it opposes little resistance to back pressure of gas, and is quickly unsealed by evaporation, is found in practice to be more reliable in keeping out the drain smells than the common S-trap, which in theory ought to be, and if ventilated would be, far more efficient.

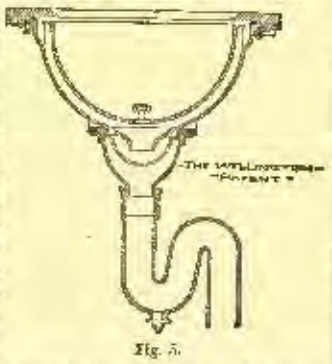


Fig. 5.

There are other basins, which go much farther in their resistance to the evils of unventilated waste-pipes by substituting for the water-trap a brass plunger valve, which is ground to its seat in the mouth of the waste-pipe, closing it perfectly until raised by the hand. The weak point of apparatus of this class is the overflow, which is either carried down separately, defended only by a water-trap, or is managed by having the plunger hollow and open at the top, so that when the water level rises to the upper opening it runs over into the waste-pipe. The obvious effect of this is that the chamber in which the plunger works is filled with gas, which oozes constantly into the room around the stem of the valve, unless a good trap is placed below the basin. A far superior device has been lately introduced under the name of Boyle's patent (Fig. 6), in which the waste is shut off by a brass plunger, as in other basins; but the plunger is made hollow, and of such dimensions that when the water rises in the bowl and in the valve chamber which communicates freely with it to a certain height the displacement of the plunger is sufficient to float it up from its seat, when the water escapes from below. A chain attached to the top serves to raise the plunger when it is desired to empty the basin. The lower edge of the plunger dips into a channel managed around the top of the waste-pipe so as to form a bell-trap of about an inch seal, and when the valve is raised there is still a quarter of an inch seal to guard against stray puffs of returning vapor.

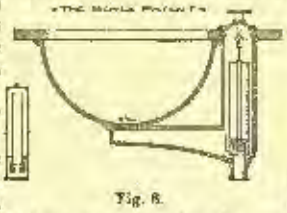


Fig. 6.

If the waste-pipe is furnished with a ventilating pipe leading from a point near the outlet of the bowl to the air, this basin leaves nothing to be desired; the brass plunger, closed at all points, is a perfect protection against returning gas, and no siphonage, vacuum, or evaporation affects its action, even if the house is deserted for years; and the bowl itself, with its valve chamber in one piece of porcelain, and the trap which can be opened and examined or cleaned by simply unscrewing a plate on top of the marble slab, form a very neat and compact apparatus. If the waste-pipe is long and unventilated, the action of the overflow in the basins, as now made, will be interfered with by the suction inevitably attending the discharge of water down such a pipe, which will draw the floating plunger back to its seat for a few seconds at a time, and possibly allow the bowl to overflow.

Col. Geo. E. Waring, Jr., devised a basin[1] in which the overflow was effectually protected by being furnished with a stopcock, worked by the same spindle as the supply cock, so that the overflow was open only when the supply cock was also open. The waste was closed by a valve, weighted so as to remain closed unless the lever was held up (Fig. 7). This was thorough work, but rather cumbrous, as overflows had to be provided for both hot and cold water to insure perfect action, and it was not always convenient to stand and hold up the waste-valve until the water had run out; and his later apparatus, in which the basin and cocks are not different from those commonly used, but the trap below the junction of waste and overflow is guarded by a brass valve, seems much better adapted for general use. The trap, as shown in the figure in its latest form, consists of a water-sealed trap, provided with a cup-shaped, weighted valve, which is thrown up by the passage of fluids, and falls back into place afterwards. No returning gas can pass the valve, which is only more tightly closed by the pressure, and any possible siphonage or evaporation of the water in the trap will not impair the seal of the valve. The action of the overflow and waste is unaffected by any suction or other action due to too great length of the waste-pipe; and to complete the list of good qualities of this apparatus, the two trap screws, one above and one below, permit easy and thorough cleaning.

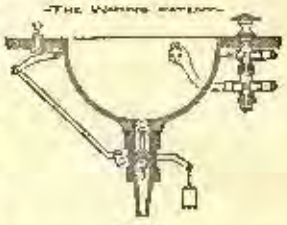


Fig. 7.

Among traps without a metallic "gate"-valve, the rubber ball-trap most nearly approaches in efficiency that just described, and under ordinary circumstances may be quite equal to it.

All these devices must, however, be regarded as palliatives, more or less efficient, of the evils arising from the radical defect of want of ventilation in the drains. With drains and waste-pipes thoroughly ventilated, the dangers against which such elaborate precautions must be taken cease to exist; with air-pipes below the traps, siphonage becomes impossible; with soil-pipes open at each end, back pressure is no longer to be feared. The only risk to which the efficiency even of water-sealed traps is exposed is that of losing their seal by evaporation, while in an unventilated system, although we can, by the use of valves, as we have seen, close our wash-basins against the entrance of sewer-gas, the foul air nevertheless remains in the pipes, at times under considerable pressure, ready to escape into the house through a leaky pipe or joint, or by the way of the sinks, bath-tubs, or other apparatus, whose traps cannot be, or have not yet been, guarded with the same successful care that has been bestowed upon basin traps.

The partial ventilation of the soil-pipe by carrying it up through the roof of the full size, and leaving the end open, or putting on a ventilating cap, is now quite general, at least in city plumbing; but the opening at the bottom, necessary to perfect action, is almost unknown in this country, though common in England. If the pipe is open only at the top, its condition is like that of a deep well, filled with stagnant vapors, which are ready to diffuse themselves through any opening. Under ordinary circumstances the gas will not accumulate pressure enough to force the traps; but sometimes, especially in city buildings, a volume of water discharged into the upper part of a soil-pipe will close the bore of the pipe, and descending, like a piston, will compress the air between itself and the tight cesspool or water-trap at the bottom of the pipe, so as to force all the connecting traps with violence, sometimes even throwing their contents out into the air.

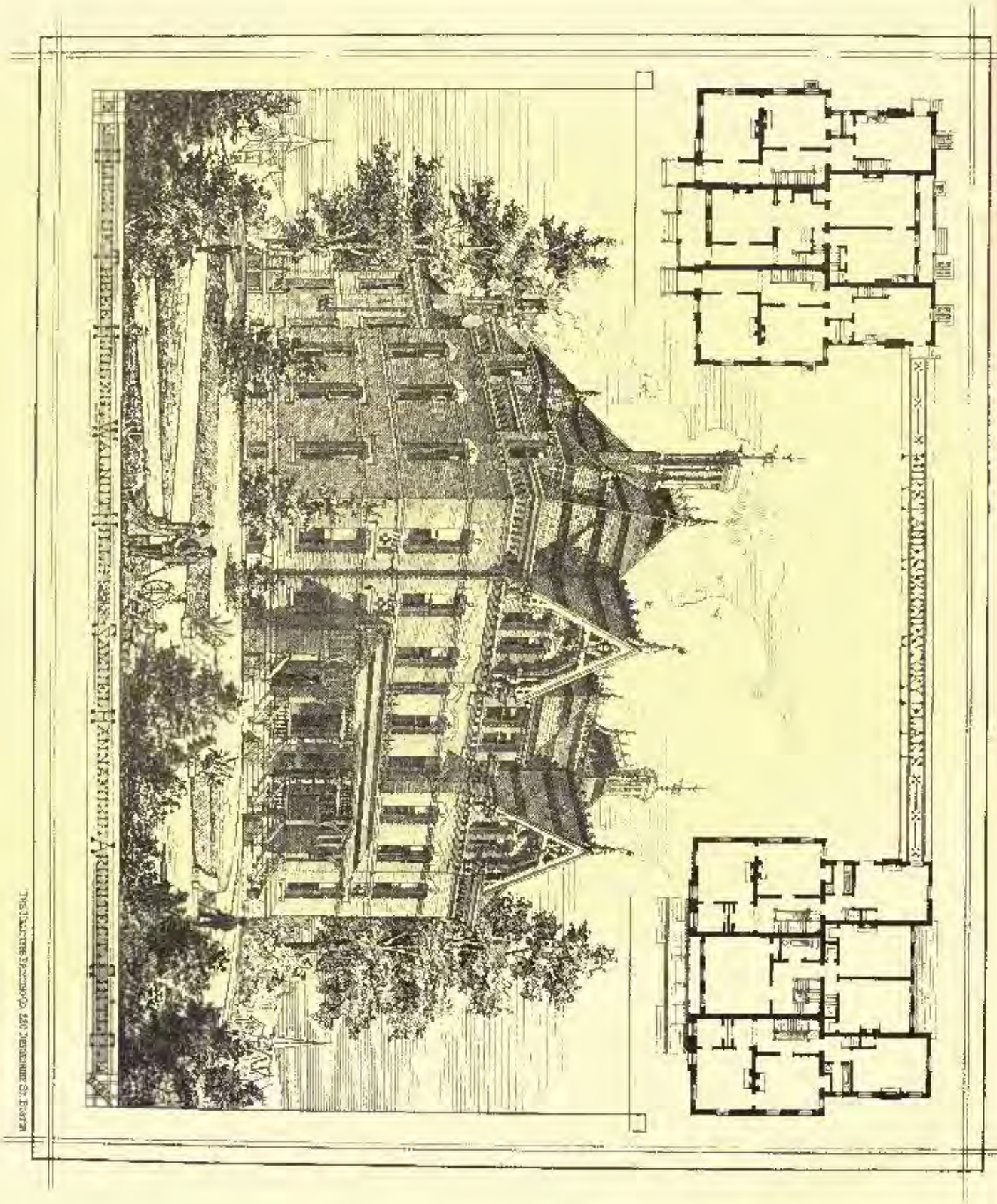
By admitting fresh air at the bottom of the soil-pipe all this is changed; a current is set up, the pipe acting as a chimney, so rapid that the air is only slightly tainted in passing, and compression by descending water is impossible.

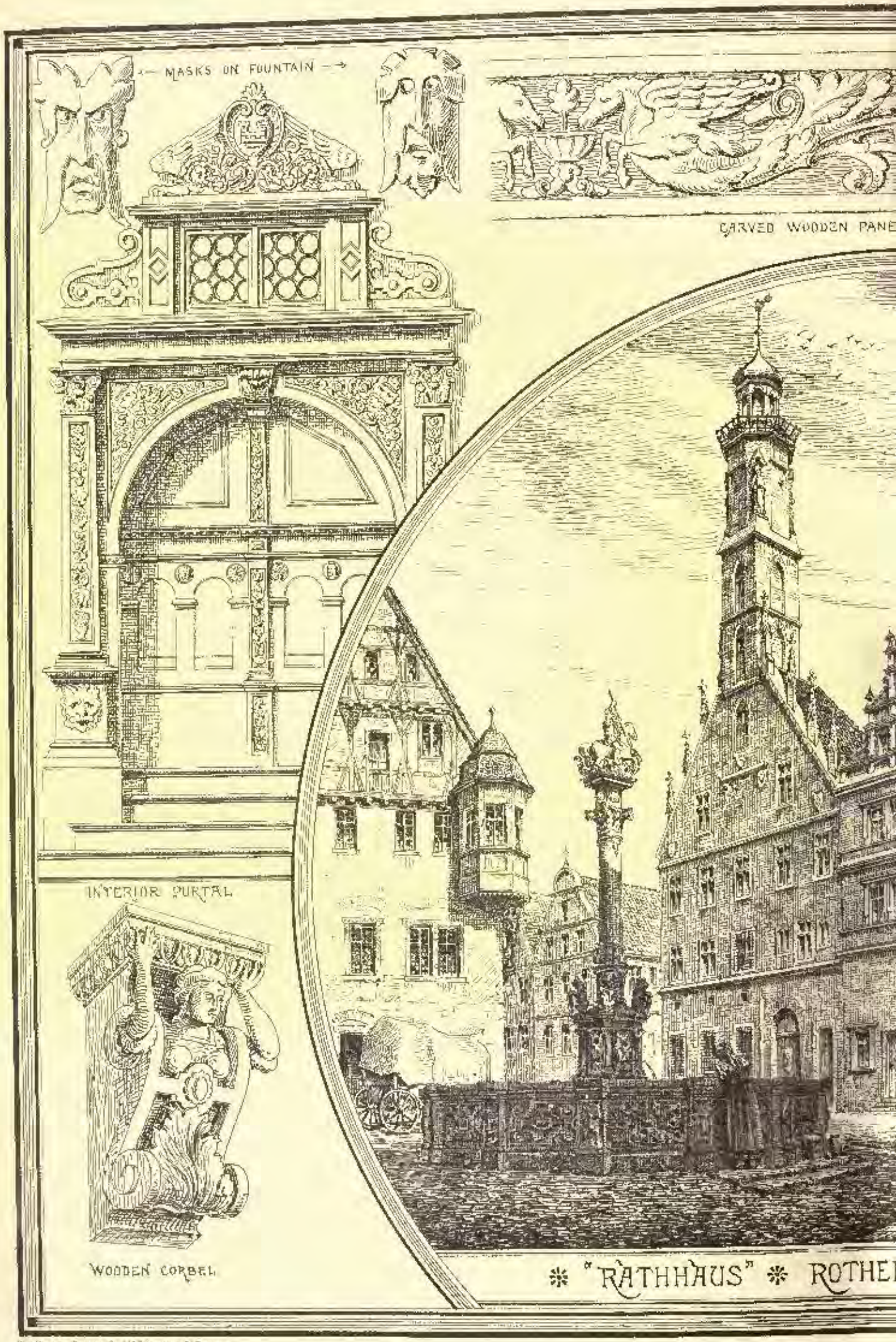
The admission of air at the foot of the pipe is effected in England by arranging it to discharge a little above a grating, under which is a trapped receptacle communicating with the drain, but such an arrangement is impossible in our climate. In country houses ventilation may be obtained by allowing the drain to run directly to the cesspool, without the intervention of a trap; then by a grated opening in the cover of the cesspool air is admitted to the whole length of the pipe. In city houses it is better to trap the drain between the house and the sewer, and carry an air-pipe from within the trap, of the same size as the soil pipe, up through the roof. This air-pipe is sometimes carried to the external atmosphere at the curb-stone, but this is objectionable.

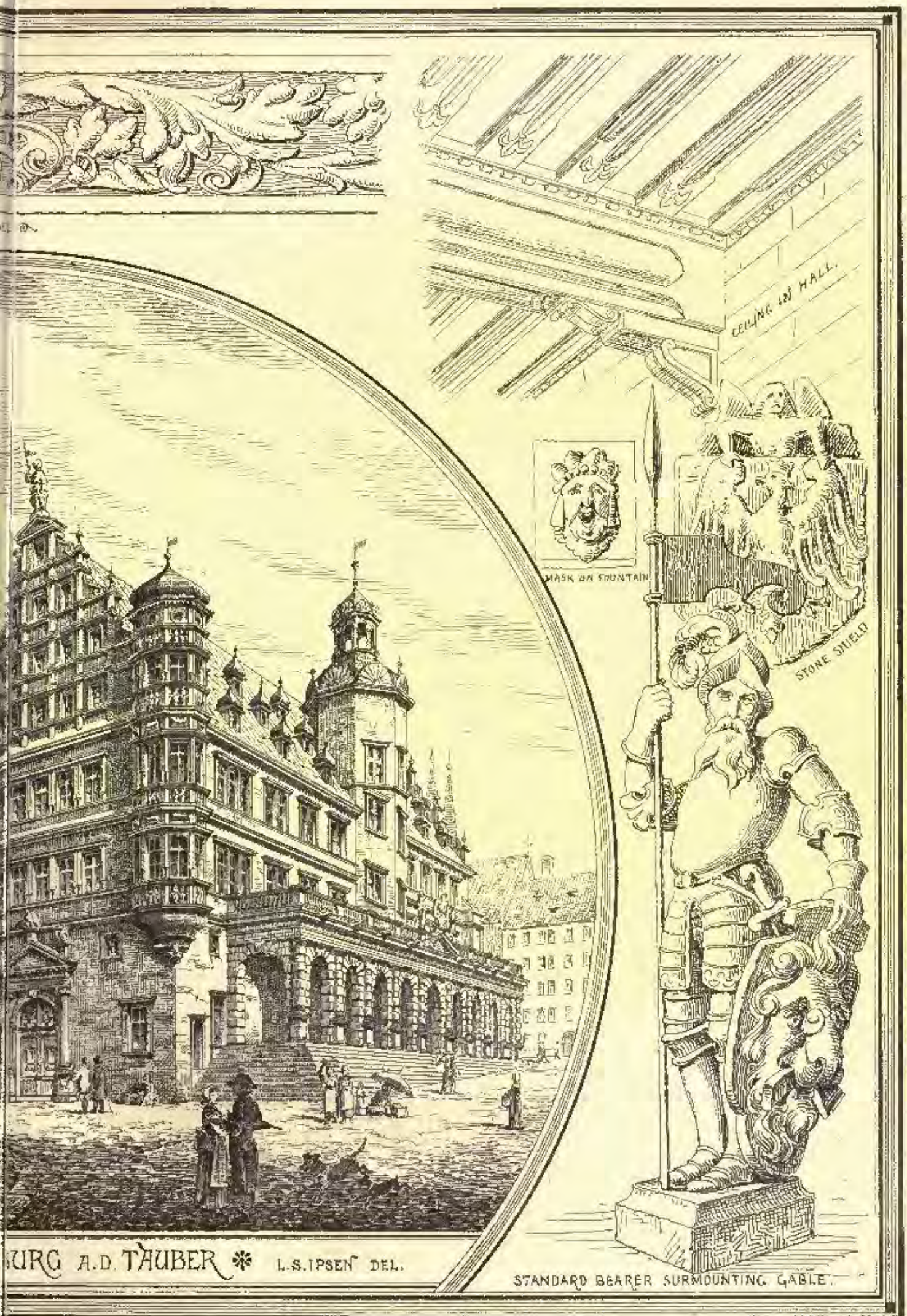
Besides the ventilation of the drains and soil-pipes, the siphoning of the traps must be prevented by carrying a good-sized pipe from each trap, just beyond the bend, to the open air. These may conveniently be connected into a vertical pipe extending up through the roof, with open mouth. Every trap should have a vent-pipe, whether the soil-pipe is ventilated or not; with such vent, even an S-trap is as secure as any water-sealed trap can be; without one, even so good an apparatus as Boyle's valve works at a disadvantage, and the independent ventilation of the smaller waste-pipes is an important auxiliary to that of the soil-pipe.

With soil and waste pipes thus ventilated, we should have little to

[1] See *American Architect* for February 9, 1878.




MASKS ON FOUNTAIN
CARVED WOODEN PANE
INTERIOR PORTAL
WOODEN CORBEL
"RATHHAUS" ROTHE


CEILING IN HALL.
MASK ON FOUNTAIN.
STONE SHIELD
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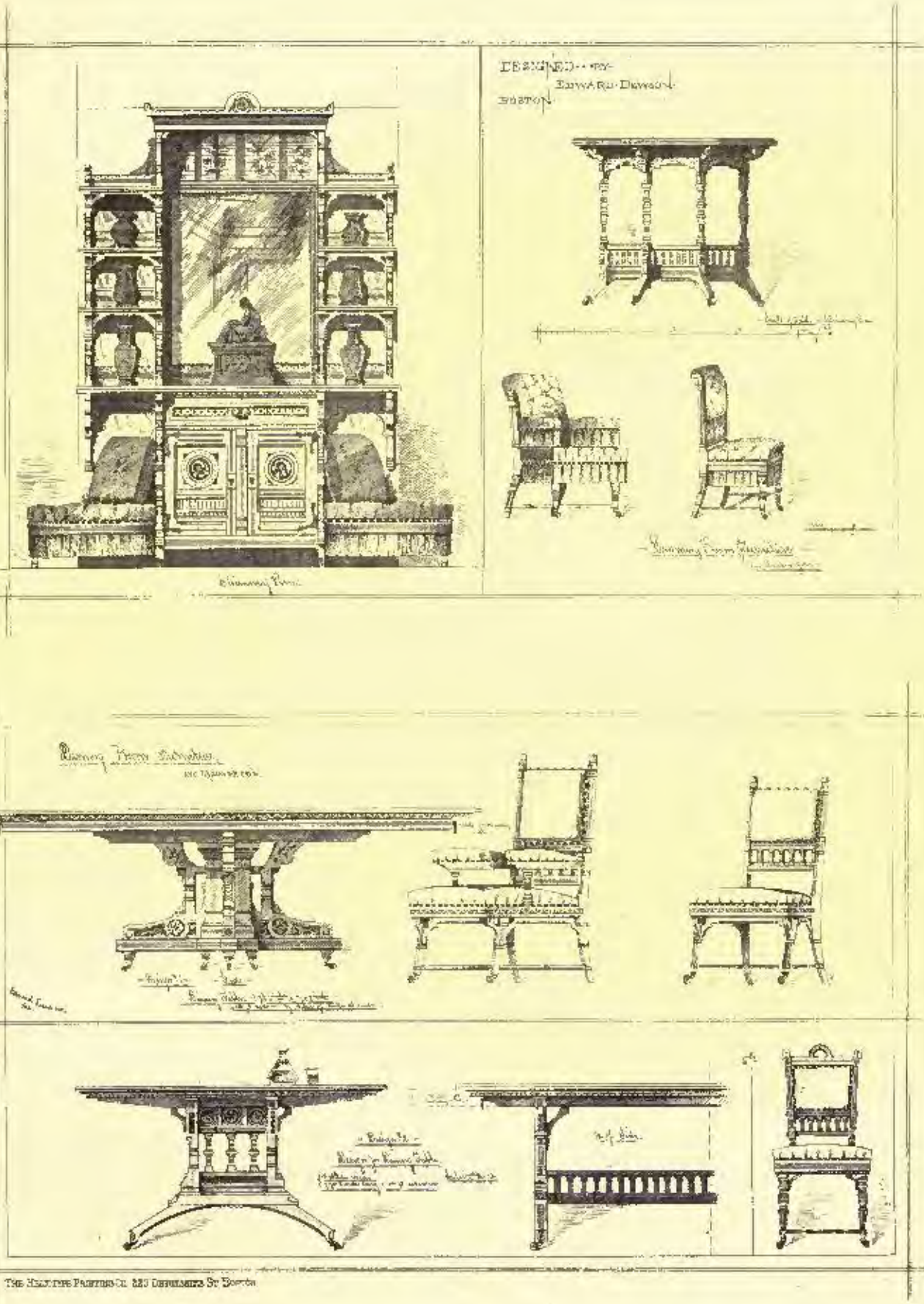
STANDARD BEARER SURMOUNTING GABLE.



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fear from foul air. Not only does the free access of air keep the traps in their highest efficiency, but in case of their failure by evaporation the current in the soil-pipe will tend to draw in air through the basins or sinks, instead of allowing vapor to escape, and even if, by reason of a considerable difference in temperature between the outside air and that of the room, the contrary should take place, the oxidation and dilution of the gas will have proceeded so far as to deprive it of its worst qualities.

THE ILLUSTRATIONS.

THE RATHHAUS AT ROTHENBURG. DRAWN BY MR. J. S. IPSEN, ARCHITECT.

FURNITURE FOR LIBRARY AND DINING ROOM, BY MR. EDWARD DEWSON, DESIGNER.

BLOCK OF THREE HOUSES NEAR CINCINNATI, O. MR. S. HANNAFORD, ARCHITECT.

THE ENGLISH NATIONAL WATER SUPPLY.[1]

No one who has given attention to the subject can doubt that great advantage will result from the public discussion which H. R. H. has initiated; for, although it is not possible to devise any one scheme of works or mode of supply applicable to the whole country, it is equally certain that it will be only by a perfect comprehension of the facts bearing upon the subject that any general action can be taken.

To secure general action of any kind it is necessary that every one should be convinced, in the first instance, that there exists at command a superabundance of water for all present and future requirements, even in the driest years, not by mere general statements, but by sufficient data to satisfy the most critical minds; and, in the next, that it only requires appropriate legislative facilities and a proper presiding control to develop the special capabilities of districts under their varying conditions, and to satisfy small villages and rural districts as well as towns and wealthy places.

To realize the first consideration, it is desirable that the following data should be before the meeting:—

1. The quantity of water falling upon the surface of England and Wales, in the shape of rain, — which is the source of all water supply, — taking the total area to be 37,324,883 acres, and the average annual rainfall to be thirty-two inches, is 27,018,682,000,000 gallons per year, which is equal to a supply of 723,901 gallons per acre.

2. The present population of England and Wales (1878) may be taken to be 25,000,000 — almost exactly two persons to every three acres of surface; and if this number be multiplied by 25, which may be taken to be the number of gallons required per person for all purposes, public as well as private, the quantity of water at present wanted would amount to 625,000,000 of gallons per diem, or 228,125,000,000 per annum; and if we double this quantity for future requirements, and add to it the quantity of water consumed by farm stock, horses and other animals, and that which is lost by conversion into steam, the total quantity prospectively required for all purposes may be put at 500,000,000,000 gallons per annum. This, it will be seen, is equal to one fifty-fourth part of the *average* rainfall.

3. The *minimum* quantity of rain that has been known to fall on the surface of England and Wales in any year within the period during which there has been any systematic record of the rainfall may be taken to have been twenty-two inches, or about thirty-five and a half times the necessary provision; but inasmuch as a quantity approaching three fourths of the rainfall (in dry years) is lost by evaporation as soon as it reaches the surface, there practically remains in such years only five and one half inches of water to maintain the river systems. This minimum depth of rain, however, represents about nine times the quantity of water required for all purposes when the present population of the country shall have been doubled, — say fifty years hence.

4. The *maximum* quantity of rain falling on the surface of the country may be taken to be as much above the average fall as the minimum is below it. At least forty inches of rain falls in the wettest years, and then as much water runs to waste and causes injury in the shape of floods and freshets as equals the whole rainfall in the driest years.

To realize the second consideration, the following physical and social facts should be recognized: —

1. That rain falling on uncultivated surfaces, naturally impervious and for the most part so much elevated as to be beyond the pernicious influence of human habitations and trade emanations, is the best of all waters for domestic supply, and is capable of storage to a very great extent as such.

2. That all rivers and watercourses originate in springs issuing from the water-bearing strata, and are maintained by the rain as it is absorbed at their surfaces. These springs, as they issue from the surfaces, remain, with few exceptions, as pure at the present time, and are as serviceable for potable use, — if their position were known and recorded, and their volume collected and stored, — as when the country existed in its aboriginal condition.

3. That the water-bearing strata which absorb, store, and eject, in the shape of springs, a considerable share of the rainfall, represent at their outcrop the larger proportion of the surface of England and Wales. The waters collected and stored in their subterranean depths are capable of affording to towns and villages singly, or in combination, throughout the breadth of their outcrops, a very large and cheap supply, if the condition of those subterranean waters were accurately known and tangibly recorded.

4. That in wet years, when a large proportion of the rainfall is not absorbed, but passes at once off the surface to collect in the valleys on its way to the sea, there exists a capability of storing such surplus water, not for potable use, for which it is unfit, but for compensating rivers and streams for the abstraction of pure water at their sources.

5. That all our principal rivers, and the majority of the tributary watercourses which support them, as soon as they form a collected volume, become unfit for potable uses, owing to their position as the drains of valleys, whereby they must receive all liquids flowing off the surfaces within their water-sheds, let the conditions of such liquids be what they may. Although rivers and streams, if they are once contaminated with putrescible matters, cease to be serviceable for human consumption, they may be retained for use in trade and agriculture, and for the production of fish, if certain standards of purity for liquids admissible into rivers were adopted and enforced, such as were suggested by the Rivers Pollution Commissioners.

6. That no jurisdiction of rivers can fully develop their capabilities that does not extend from their source to the sea; and that inasmuch as many springs which feed rivers rise at a great distance from their trunks, and flow by minor courses through private properties, it follows that no conservancy can be perfect which does not extend beyond the main rivers and minor streams to the extreme water-shed that is tributary to them. All springs which maintain rivers and rise in private estates, and are thus made private property, should be guarded by conservancy as vigilantly as the river-courses themselves, on the ground that they contribute to the general water supply of the country, and should be available for human consumption at their source before pollution. Many of the streams fed by these springs, and by the water of under-drainage, being polluted by mixture with the off-flowing water from cultivated surfaces, may be restored to a safe condition by filtration through natural soil, and thereby rendered fit for human consumption, where waters from uncultivated surfaces, or from springs, or from subterranean water-beds cannot be directly obtained.

7. That Parliamentary powers are frequently sought, and occasionally obtained, enabling large and wealthy communities to obtain supplies of water from distant river-basins, irrespective of local and prospective demands, before the capabilities of the basins within which such wealthy and large towns exist have been exhausted, although the committees granting these powers are incompetent in themselves to appreciate the difficult questions involved in the water economy of a country, the population of which has doubled itself within the last fifty years, without any means of extending its superficial area, or of increasing the rain falling upon it.

As it is the wish of H. R. H. the Prince of Wales to ascertain "how far the great resources of the kingdom might, by some large and comprehensive scheme of a national character, adapted to the various specialities and wants of districts, be turned to account for the advantage of the general body of the nation at large," I desire to express my conviction that if by the term "large and comprehensive scheme of a national character" it is suggested that one scheme of works or one mode of supply can be devised which shall be applicable to the whole country, I am not of opinion that such an object is practicable. The great difference that exists in the rainfall as a source of supply, the diversity of surface, the variety of soil upon which the rain falls, and the irregular denseness or sparseness of population in proportion to space forbid the realization of such an idea.

I am, nevertheless, perfectly convinced that if there existed (1) a proper conservancy of rivers extending over the whole area of their basins, (2) an exact knowledge of the hydro-geological conditions of each river-basin, and (3) legal facilities for dealing with the water rising up within, and flowing through, and existing under private properties, there would not be a single village in the country but might be abundantly supplied with pure water.

To render river conservancies competent to exercise that control over river systems which would preserve riparian and private rights, while securing to the public the enjoyment of the chief element of health, — pure water, — the first step to be taken should be the collection of all existing information bearing upon the surface and subterranean waters within each river-basin, prepared on such a form as to be immediately available and capable of enlargement as fresh information may be obtained. At present there is no reliable record of such data within the reach of either local authorities or engineers, although a mass of information exists in a scattered and very costly form, in the Ordnance and Geological Survey Departments, which might afford data whereby neglected springs and subterranean waters might be turned to account. Were this information obtainable in an authoritative shape, the indisposition of the owners of landed estates to place at the service of sanitary authorities the sources of supply which they possess by territorial right would cease to operate as injuriously as it now does.

[1] A paper presented to the late National Water Supply Congress by Mr. J. Bailey Denton, and published in the *Journal of the Society of Arts*

Numberless examples of what may be done in the way of water economy, by the use of wheels, turbines, rams, and pumps, and in the way of storage, for village supply, are to be found scattered over the whole face of the country. If these instances, instead of being disregarded, or only cursorily mentioned in Parliamentary Committees, were carefully examined and described in a popular but practical form, the serious want of water experienced in villages and rural districts, which induced H. R. H. the Prince of Wales to come to their rescue, would vanish in a great majority of cases; though so long as permissive laws stand in the place of compulsory laws in a matter of such vital consequence to every one as pure water, and Boards of Guardians are the judges of the time and course of action, so long will the present state of things exist.

During the last session "The Limited Owners Reservoirs and Water Supply Further Facilities Act, 1877," was passed, enabling land-owners to construct works of water-supply on their own estates, after having entered into a contract with any neighboring sanitary authority, to supply the inhabitants of their district with water, to borrow money for the purpose, and, with the approval of the Inclosure Commissioners, to charge their estates with the amount borrowed. Two conditions are imposed: first, that the amount borrowed, should be repaid by instalments extending over a limited period of years; and, second, that the income to be derived from the sanitary authority for water should be sufficient to satisfy the Commissioners that the reversionary interests in the estates charged will be benefited by the transaction. If the powers of this Act were judiciously administered, they would work most advantageously to the country. So comprehensive are its provisions that a land-owner can not only construct reservoirs, or erect dams, for the storage of water, but he may utilize springs issuing from the surface, or he may sink wells into a water-bearing stratum, and, having secured a sufficient quantity, conduct it by proper service mains, in connection with suitable appliances, to any inhabited district within reach.

In the present session of Parliament, "a Bill to amend the Public Health Act, 1875, so far as relates to the supply of water," has passed through committee. Its object is, primarily, to compel the owners of small dwellings in rural districts to provide water where it does not exist "within a reasonable distance;" and, secondly, to facilitate the acquisition of a district supply where it is shown that a general provision would be more economical than separate arrangements. To those who are intimately acquainted with the conditions and influences which govern rural districts, and know that the owners of cottages in villages are generally persons of small means, with very limited belief in sanitary benefits, while the members of the Board of Guardians, who are to order the water to be supplied, are themselves, for the most part, the employers of the laborers who occupy those cottages to be supplied, and who will, therefore, have to pay for the water in one way if not in another, this bill does not promise much. It is believed that the want of proper dwellings for rural laborers, and the absence of all profit from cottage-building, are difficulties in themselves, which should be overcome before it is legally declared that the cost of providing water to cottages in a village should be borne by the owners of those cottages rather than by the village community as a body.

IRON AS A BUILDING MATERIAL.

Using a popular formula of speech, it is often said that iron is the material of the future. The fancy of the philosophic builder is supposed to run over a hundred instances in which the more commonplace substances used in construction are found wanting. Visions of what might have been if ingenuity had not been hampered in its enterprise by the conditions attaching to mere stone and brick, timber and boards, are supposed to overwhelm his mind. He finds rest in the contemplation of the Crystal Palace, the St. Pancras roof, the Britannia Bridge, the Vienna dome; perhaps the Great Eastern, the Devastation, and the Thunderer. "Ah, well," he reflects, "iron is the material of the future; the time will come, although I shall not live to see it, when a gentleman will run his iron house down to his place in the country by rail in August, and up again to the Belgravia of the day in February; when balloons of No. 40 or 50 gauge sheet will travel daily between London and New York; and when a new St. Albert's Cathedral, in a central situation at Wimbledon, will be built of Professor Barff's best black oxidized." Professor Barry, for instance, of the Royal Academy, who officially might not have been expected to look so far ahead, is amongst others as enthusiastic upon this point as could be desired. The architecture of the world in the future can scarcely fail, he says, to be modified by our scientific knowledge of iron, which as a building material has been almost discovered by the present generation. From the Egyptians — to whom it is, of course, impossible not to allude — we have no doubt much to learn; from the Greeks also. But had the Romans known as much about iron as we do they would have been able to teach us something. The mediæval builders also would not have clung to their primitive ornamentation if they had known about iron. In the present day architects are too considerate of the past; if they would but consent to let engineers help them in construction in exchange for similar assistance in decoration, — in short, iron would then become the material of the future.

The Conference of Architects, which was held last week, seems to have dealt with iron, if nothing else, seriously. Professor Barff explained his system of creating upon the surface of this metal — as the weather does upon certain others, such as lead and zinc — a preservative oxide. Under the presidency of Mr. George Godwin a variety of fireproof inventors discoursed to each other upon the protection of iron from its inevitable destruction in great fires. Mr. Barlow, C. E., described at another meeting the construction of an iron roof recently designed by him; and thereupon Mr. E. M. Barry wound up the whole with the thoughtful reflections we have quoted. If nothing comes of all this, it cannot be said that architects have not at least, and at last, taken the subject into consideration.

But there are people of still more careful habits of thought who will shake their heads, and say that nothing can come of it after all. Indeed, when Mr. Barlow, speaking incidentally of the great Tubular Bridge of Robert Stephenson, tells us of one thing being perfectly clear, — that no such structure will ever be built again; and when Mr. Carroll, of "unpractical, romantic Dublin," tells us how he and an engineer companion, as they travelled along it, shook in their shoes with a great fear lest the wonder of the world should shake itself and all that was within it forthwith into eternity, by reason of the "tons upon tons" of ruinous rod rust shaken perpetually from its dreadful danks, these authorities are indicating pretty clearly that the scientific mind is already being rapidly disillusioned, and that before long there will be no one left to believe in the perfectibility of iron buildings, unless it be such a one as a professor, whether of architecture or of chemistry, in the Royal Academy.

It is by no means a paradox to say that nature does not undertake to supply man with building materials. He is permitted, no doubt, to hew stone from the rock, and to fell timber in the forest, and it must be acknowledged that these accidental products have gone very far indeed to serve the builder's purposes; but the not unreasonable theory that the artificial objects of building must be taken to point to the use of correspondingly artificial materials is one that has in reality been exemplified from the most primitive ages, — in the invention, for instance, of such an old thing as brickwork; and when we are led in modern times to try what can be done with iron, it is the self-same principle that is manifesting itself, — building is being driven by its own essential artificiality to seek artificial materials. In other words, reasoning upon the matter *a priori* if not otherwise, we are entitled to say that nature cannot be expected to provide to the architect and the engineer, more than to the mechanist, anything beyond the crude components out of which he shall make for himself such materials as shall best serve his ends. But however this may be, it is plain enough that in this respect the line must be drawn somewhere which shall divide the practicable from the impracticable; and it is, perhaps, more than probable just now that that line must be taken to exclude iron in a very great measure from the list of true — that is, permanent — building materials, and to leave it almost entirely to mechanical engineering and other such manufacturing art as its more proper province. Such perfectly artificial materials, for instance, as brick, terra-cotta, artificial stone, concrete, cements and plasters, lead, glass, paint, and so on, answer the builder's artificial purpose admirably. There are, likewise, many appliances of building, akin to mechanical work, in which iron is almost as invaluable as it is to the mechanician generally. There are also certain incidents of building in which, for even structural features, iron comes to take the place of timber with excellent effect, as in columns and girders judiciously introduced. But here it would really seem as if we must stop forever; crude as natural stone may be, iron cannot take its place, and, fatal as may be the effect upon timber of the dilapidation of centuries, the case of iron as a substitute is much more serious within much shorter periods of time.

The employment of iron in ordinary building is to be fairly described as being altogether that of an equivalent for timber. The principles involved — those of the joist and girder, the bent arch, the truss, and whatever else — are precisely those of timber-work, and a sheet-iron covering merely takes the place of boarding. Bolts and rivets represent screws and nails, and even the angle-iron has its prototype in the work of the joiner. The only advantages derived from the use of the metal are in respect of strength and lightness, complexity of scientific design, and minute precision of calculation. Apart from these considerations, we might just as well even now be dependent exclusively upon our old-fashioned fir and oak, — old-fashioned, no doubt, but still as far as ever from being obsolete. Where, then, is the great drawback in the use of iron-work? Why is it that it has not during the last fifty years, since the invaluable article of poor Cort's invention — rolled iron — has become so intimately available and so cheap, acquired an absolute ascendency over the timber-work which seems by its side so clumsy and unmanageable? The answer may be given in a single word, — rust. Of all metals, perhaps this, the most useful in a thousand ways, is the worst to wear against the weather. Moisture in the simplest form is its deadliest enemy. Lead or zinc, for instance, as we have already hinted, when exposed to atmospheric action, becomes coated with an oxide of itself, which renders paint useless as a preservative; but iron, in forming its oxide in the same circumstances, develops a process of absolute disintegration, and falls rapidly to powder, and no preservative process yet known will protect it. Common painting, it has to be borne in mind, is simply the act of attaching to the surface of any more perishable material a coating of carbonate of lead as a material less perishable and easily renewed. Not merely oil paint, however, but the application of a coating of zinc, a much more scientific and

successful invention, is scarcely of any permanent use in practice; and if we fail in protecting our iron-work from disastrous rust, we fail in making it really serviceable as a recognized building material. Not only the architect, but the engineer more the less, must acknowledge this; and when the architect is obliged to discard iron in so great a measure, it becomes a question of time when the engineer also may have, however reluctantly, to regard it with universal anxiety.

Supposing that the general surface of the iron may, by the judicious application of some specially adapted coating, and its frequent renewal, be kept quite free from oxidation; this unfortunately does not help us, after all. It is the peculiarity of iron-work that it is never at rest. It expands and contracts considerably under ordinary changes of temperature. It vibrates still more considerably under ordinary pressures. If, therefore, we are obliged to put it together by means of such a process as riveting, — if, in other words, we have to make it up of small pieces pinned together, — then are these considerations which at once appear with reference to rust. A thousand joints offer access to the microscopic influence of atmospheric moisture in a thousand places. A thousand pins — call them by what name we please — are in one way or another constantly moving under strain, however minute their movement. Nor is this all; for, in the very act of putting the work together at first, if any preservative had been previously applied to the surfaces that are now brought into contact under the force of the smith's hammer, it is only too plain that at the very weakest points of all the preservative has been abraded quite away, and the veriest nakedness of the metal exposed again to the most direct and rapid creation of rust. Not only all paint, but what is called the galvanized coating of zinc, is obviously immediately rubbed off whenever a rivet is hammered, or even a bolt tightened by a wrench. What makes the case still worse is the circumstance that oxidation, when once begun, will insidiously continue to progress even under the preservative coating. It is easy, then, to see that, of all materials as yet employed in building, iron is in practice the most incapable of defence against a peculiarly disastrous decay produced by the most commonplace, most universal, most unavoidable, and most insidious process of attack. The invisible and motionless vapor of the air, which nourishes the world, is the inevitable and special destroyer of the mightiest substance manufactured by the ingenuity of man.

That these reflections are a serious check to the aspirations of building science it is needless to deny, but enough has been said to show even to the meanest capacity that, so far as it has yet gone, iron is emphatically not the material of the future. — *The Architect.*

CORRESPONDENCE.

WHAT THE ELEVATED RAILWAY ACTUALLY DOES FOR STREET ARCHITECTURE.

NEW YORK.

It had been my pleasure, as it had been no doubt the agreeable occupation of many others as well, to take frequent strolls about the city, studying the buildings and finding amusement and profit in seeing what had been accomplished, and gaining warning and wisdom by the failures of others. But now upon several important avenues of the city this experience is enjoyed only in reminiscence, for with the rise of the elevated roads the opportunity to do anything in the way of sight-seeing is entirely gone. Before the streets were straddled by these gridiron structures there was opportunity to see the collection of buildings which make up the town, but now it is only by much care in selection that one may find a vista, where up and down the thoroughfare the eye may wander along the lines of buildings, and enjoy a panorama which can only be met in the heart of a great city. Do you not believe it? Come with me, and let us work our way up town, under the shadow of this thing, which stands at once a monument of American character and simplicity, shows with what a reckless disregard of cost New Yorkers set about securing their ends, and proves that their squandering is not all done during European trips.

We are at the Battery, where, if the will only existed, the finest residence in the city might be secured without any need of rapid transit. Turning into New Church Street, cut through at so great an expense but a few years ago, we find one end of the long iron ribbon. The street is dark and damp; not quite as dark as a tunnel, nor is it running with water, but it has not the bright, open sunniness that we have a right to expect. The first few blocks are ordinary warehouses and not much is lost when they are cut off from view. To our right is the great pile of the rear of the Adams Express Company's Building, worth looking at, but lost to view forever. Trinity Church comes next, and here the sacrilege of the road begins; not content with making a Pandemonium of the neighborhood of the church, they have cut off what was one of the best views of it. The seven-lighted chancel window, with the quatre-foil in the gable, and the clerestory and the rows of pinnacles, bearing testimony to the honest, unambitious work of one of the first architects New York ever had, all are gone; while the Withers addition to the chancel end of the church, which we have hardly yet had an opportunity of seeing, is, as it were, smothered in its birth. Its effect may be good, as its details are certainly carefully studied, but it is gridironed out of sight. Across the street a lowly structure, now a vile-smelling stable, bows its ancient head before the iron Moloch, and recalls the poet Bryant's natal year in the inscription over the door, "The Episcopal Charity School, 1794." Mr. R. M. Upjohn suffers no less than his father in having the Trinity schools cut off. To be sure, from Trinity Place the upper story and tower may be seen, but such disjointed views of a building are unsatisfactory, while the gargoyle heads at the tower corners look out as though to vomit their indignation upon the inebus below. St. Peter's School, on the corner street, suffers with its neighbor, showing that the railway is no respecter of creeds, as it surely is not of personal rights. The Liberty Street Police Station next is thrown into the shade, while the view of Liberty Street to the Mutual Insurance clock is another of the past privileges. The Coal and Iron Exchange suffers with a station directly at its side. The angle view of the building is gone, but then one can walk Church Street, even though it be in partial darkness, without catching a glimpse of that meaningless pediment and pair of columns which make the main entrance of the building so pretentious. St. Paul's Church, now the oldest ecclesiastical structure in the city, is not spared, and the view from Fulton Street across the old church-yard to the Wrenish spire, is gone, with all its associations. At the northwest corner of Vesey and Church Streets is an iron front worth the looking at if it could be taken in perspective; but now the only view is one in elevation, had with the penalty of an almost dislocated neck. The classic front of St. Peter's Church, at Barclay and Church Streets, from the opposite junction of three thoroughfares, now shows only a few bases with bits of column attached.

We will be honest in our observations, not shut our eyes to the good points of the road and note that at Park Place a providentially placed station hides in a measure the *Tribune* tower. But the road is leaving Church Street, and makes an ugly twist over the sidewalk at Murray Street; and it is noteworthy with what respectful deference thus far even the busiest of those below avoid the chance of a crush, and give the iron horse the right of way below as he certainly has it above. When he has passed on we resume our walk. College Place lying low the posts run high, and the grouping is rather less strongly felt. At Chambers Street the view up West Broadway and along to South Fifth Avenue can no more be taken. Thruber's store is there yet, about this point, but its cheek is rudely rubbed by the intruder. Claflin's wholesale house is caught by the iron hand about the third floor, and on warm days the dust, smoke, and cinders flying in at the open windows can be no advantage to the fine goods. One result of having the road high is that all the little, scrubby shanties show off as well as ever. The little parks along the route are pounced upon by the station designers to drop their dog-legged scales and threatening platforms upon. St. John's Church has a Renaissance tower, and looking up York Street it could once be fairly viewed, but can be so looked upon no longer. Jumping Canal Street, the comparatively new church of St. Alphonse gets whatever of beauty it may have had effectually hinted from sight. Very considerately the road of South Fifth Avenue constricts itself, giving us a chance to still look upon the "dear cabin homes" which bolster each other up along this broad avenue, and give shelter to countless broods of pickaninnies. Along this section, too, the hollow box-girders which are employed respond like so many sounding-boards to the roar of the passing trains, and a capital imitation of heavy thunder is afforded the street passenger. At the corner of West Third Street is another twist and another passage over the sidewalk, and again the sub-ferruginous public respectfully stand aside. Here St. Clement's Church gets its quaint little face still further hidden. The Union Reformed Dutch Church wardens no doubt thought they had a choice site on Sixth Avenue opposite Third Street, but they must now take a very close view of their shrine, since the iron will of the contractors has cut off the long view. St. Joseph's Church, on the block above, never very conspicuous, is still less so now, and the Greenwich Bank building, by Mr. Thomas, architect, has lost its quiet dignity in the company of the mid-air rail. At the Jefferson Market Court House there is provocation for a downright anathema. We had hardly begun to get at the full merits of the tower and its attachments, and had only begun to enjoy this really good thing, when it is swept from our sight by this piece of convenient ugliness. The old Lutheran Church at Fifteenth Street, and the Jardine flats corner Fifteenth and Sixteenth streets, suffer for their contiguity with the road by having all good view of them cut off. The modest bit of crude Gothic in the Church of the Holy Communion, corner Twentieth Street, has gone into an iron, in addition to its leafy, seclusion.

At the corner of Twenty-third Street the road makes a double stroke, and decapitates at once Renwick's excellent bit of Italian in Booth's Theatre and Le Brun's Masonic Temple. No doubt there are many who admire both of the buildings, but they can do so now no more. The confusion and the obscuration are intensified by the great platform built at this point. St. Omer's Hotel, under the flank of the Temple, runs chance of having its secrets exposed to the rattling passengers, while its garish face is lost to sight.

The Racquet Club building is the next victim of the road, and a real victim too, for it had a story to impress of honesty in construction, freedom from shams, and truth of expression which no other building of the city so well combines; but it is gone. It was one of the few buildings of the city that are really architectural in conception and treatment. Ah, here is another good point! By keeping carefully to the west side of Sixth Avenue the traveler may walk up and down without having the Union Dime monstrosity thrust in his

fase; for this, thanks. Dr. Taylor's church once enjoyed a favored and conspicuous site, but now it takes its chance with the other victims along the line. From the opposite side of Reservoir Square the passing to and fro of trains makes a pretty spectacle; but Lyric Hall is out of view, and on the opposite way the churches on Fortieth and Forty-second Streets, with the Harmony Club House and the Hotel Royal, all go into obscurity to Sixth Avenue pedestrians. Above Forty-second Street a few showy flats have their gaudiness put out of sight by the road, though no one loses much except perhaps the owner, who finds pleasure in seeing brown stone textured. At Fiftieth Street, there was at one time a view up the street to the Roman Catholic Cathedral, where one tower could be seen, but the pleasure of this view is henceforth a mere remembrance. Dr. Hall's church and Dr. Morgan's church have towers and spires which are worth the looking at, but now the occasional glimpses that might have been caught over the house-top or along the street openings are gone. At last we reach the Park, where there is a great pother of pulling dummies backing to and fro, making an escape into the Park a leap from Hades to the shady side of Elysium. With such a construction before him, there is no encouragement for a property owner on the line to build a striking or expensive façade. And then think of the money sunk in attractive signs along the route! The four miles of the road render useless, because invisible to any large number of people, at least twenty thousand dollars' worth of signs.

But let us shake off the general dustiness we have gathered by the walk along the substructure of the road, forget the holes burned in our coats by hot cinders, overlook the few grease splashes upon our summer hat, and forgive the brakemen who found amusement in squirting tobacco juice down upon us, and let us go up and follow the unthinking populace in encouraging the monopoly. Oh, how delightful! Bless me, here we are at old Trinity again! I take it all back; let architecture and property rights and personal privileges and past associations, perish, so long as we can so fly through the air without losing suit. W.

A QUESTION IN PYRONOMICS.

Charleston, S. C.

To the Editor of the American Architect:

Dear Sir,— Will you be kind enough to inform us, if you can, if there is danger of spontaneous combustion arising from sawdust being confined in the floors and walls, etc., of a factory (door) such as our own.

Also, if there would be danger from the same material being used as filling to deaden sound between the ceiling and floor of a schoolhouse; would spontaneous combustion be likely to arise under these circumstances?

An early reply will greatly oblige, yours very respectfully,

T. Manuf. Co.

NOTES AND CLIPPINGS.

The Assault on Labor-Saving Machines. — The Grangers of Ohio and Illinois are reported to be suffering just now from a most audacious attempt at wholesale "rattening," which is done either at the instance of the army of tramps or of communistic workingmen. The old-time war cry against labor-saving machines has been raised once more, and the farmers, under threats of barn-burning and bodily injury, have in many places been obliged to put by the reaping machines and binders, on whose powers they have depended to save them from pecuniary loss in harvesting the crops, and have been forced to get in their grain by hand. It is a question whether those who yield to the threats will be any better off than those who resist them, as far as pecuniary matters are concerned; for it can hardly be the intention of the men who make the threats to labor honestly as was done before the days of reaping machines, even if disuse has not caused them to lose their grandam skill. Wages have not fallen in the same ratio as the market prices of daily necessaries, and to attempt to make a profit on grain that must be sold at ante-bellum prices, while wages double those paid fifteen years ago must now be paid for half the work, cannot but prove disastrous. It cannot cause wonder that some farmers have decided to harvest by machinery, or else let the crops rot where they stand.

What British Workmen may see at Paris. — Apropos of the suggestion of the Prince of Wales that a body of English artisans should be sent to Paris to examine and report on the Exhibition, in the same way that the French artists visited the Centennial Exhibition and as a similar body of American workmen is visiting the Exhibition at Paris, the *Pall Mall Gazette* offers this pertinent bit of advice: "In order that it may be as useful as possible, the artisan reporters should be advised to take careful note of the great advance made by foreign manufacturers in competition with English, an advance that of course arises mainly from two causes, — the superiority of their workmen, and the fact that they can be depended upon to execute orders. They will find that strikes, and the uncertainty they have introduced into contracts, — no manufacturer feeling sure that he shall be able to execute his contract either as to time or as to price, — are rapidly throwing the work of the world into foreign hands. They will find that while they have been standing idle, — in a self-created paradise, as if they had a monopoly of technical intelligence and skill, — the foreigner has gone ahead, and that his workmanship in many departments of skilled labor is now equal to or even better than English. If they bring back from Paris a conviction that no time must be lost in retracing false steps, and can succeed in imparting that conviction to their fellows in their several workshops, they will do a service to the class to which they belong exceeding any knowledge of processes or products which they may acquire." This lesson might with advantage be taken to heart by our own workmen.

Government Treasure-Vaults in New York. — In addition to the great vault attached to the Assay Office in Wall Street, built about three years ago, and having space for the storage of $8,800,000 in silver coin, the Federal Government has in course of construction in the basement of the Sub-Treasury building still another of far larger dimensions, which will be finished October 1. The former is 18 x 17½ feet, and 8 feet in height, made of boiler iron; the latter, 47 x 28 feet inside, and 12 feet high, made burglar proof, designed for the expected large accumulation of silver coin under the operation of the new law. This new vault is building under a contract with Geo. L. Damon, of Boston, who has about twenty men employed on the work, and is spoken of as the largest in the world, considered as a single inclosure, surpassing even that of the Bank of England. The estimated cost is $22,000. The outside granite walls are six feet thick, while the safe proper will be two inches in thickness on all sides, formed of alternate layers of iron and steel. The places for the floor are laid directly on a stone flagging, supported by a solid bed of concrete, so that it would be folly for burglars to attempt to reach the treasure within by any process of excavation from outside. The top of the vault will be supported by rolled iron beams and girders let into granite columns, while lattice partitions of iron to support the bags of coin will divide the vault into a dozen stalls, arranged on either side of a longitudinal aisle. The general plan is not unlike that of an ordinary horse stable, and keeping in mind the heaps of treasure to be stored on the spot hereafter, is suggestive of excellent feeding. Four openings in the ceiling and as many in the floor, covered by strong gratings, will provide for ventilation. The process of cutting out the brick floor of the Sub-Treasury building so as to convert two stories into one, is the laborious task now engaging attention, directly under what is known as "the gold-room." When completed, communication between the gold-room and vault will be by means of an elevator and staircase, so that coin can be easily transferred. — *The Iron Age.*

Cheap Land. — A large sale of land was made in New York on June 26, which was remarkable for the low price at which the land was sold. The average price per acre, realized on 360,000 acres of good white-oak timber and mineral lands in McDowell County, W. Va., was only one cent.

Delaware Mounds. — Certain mounds on Middle Sound, about ten miles east of Wilmington, Del., have been opened lately, and in the middle of one of them were found charred bones which evidently belonged to more than one person. It has been suggested that they may be the remains of some of the colonists of Sir Walter Raleigh's unfortunate expedition, concerning whose fate so little is known.

The Sutro Tunnel. — About 11 o'clock P. M., July 8, connection was made between the tunnel and the 1650-foot level of the Savage mine. A strong draft of air at once poured into the mine, blowing out the miners' lanterns and wafting the Savage drift with dust and gravel.

Waterloo Bridge, London. — The trouble with the Waterloo Bridge in London is that when it was built sixty years ago the masonry was started on piles, only two feet below the bed of the river. The river is now eight feet deeper than it was then, and the wooden cruiches appear to have suffered from undermining, and are now considered unequal to support the superstructure above. The engineers recommend that the wooden pier be fenced round with wrought-iron caissons filled with concrete till the whole is a solid mass, which, it is stated, will render the bridge perfectly safe.

Durability of Lead Roofs. — It is said that the lead roof of George Heriot's Hospital, at Edinburgh, has lasted since 1650, an occasional patch being the only repairing that climatic action has made necessary.

Influence of Light upon Cement. — Dr. Heintzel thinks that the influence of light upon cement has not hitherto been sufficiently considered. He instituted some experiments upon a quantity of cement, which he divided into three parcels, exposing parcel A to the air and full light, B to the air and diffused light, and secluding C in darkness from the air. After six months he found that A made a weak mortar, by absorbing 38 per cent of its weight in water, and it had become crumbly; B, with 33½ per cent of water, made a mortar which was too adhesive to the trowel, and it yielded up none of its water; C, with 33½ per cent of water, made an excellent mortar, easily stirred and flowing, and it relinquished some of its water. After setting for twenty-eight days, the relative strength was: A, 3; B, 37.3; C, 44.6. — *Dingler's Journal.*

Photography and the Electric Light. — An architectural photograph of a large building, says the *Scientific American*, has been taken in Dundee by means of the light from a Gramme dynamo-electric machine of a power equal to 800 candles. The view was taken by fifteen minutes' exposure in a crowded thoroughfare, during a drenching rain, and within an hour of midnight.

A New Way of Producing Magnetic Oxide. — The Chicago *Tribune* says that a process simpler than Professor Barff's for procuring iron from rust has been invented by Mr. G. Bower. He places the articles to be coated in a chamber of fire-clay provided with two pipes, one for the admission and the other for the escape of air. Both pipes having been closed, the heat is raised to a temperature of about 1,700 degrees Fahrenheit. At the end of such heat the pipes are opened, so that atmospheric air may be forced into the chamber by the one, and the deoxodized air driven out through the other. This is continued until a sufficient film of magnetic oxide is formed on the articles. The coating is a beautiful light gray or neutral tint, very delicate in appearance, and it perfectly protects iron from rust. Under all circumstances, the invention is deemed to be invaluable.

Statues for the University of Kiel. — The models of the statues which are to decorate the façade of the University of Kiel have been submitted for approval by the sculptor, Leopold Rau. They represent Plato, Solon, Hippocrates, and Aristotle, and are highly commended.

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CONTENTS.

SUMMARY:—
The New Chair of Architecture in the College of the City of New York.—The Chance that the present Patent Office Competition will become a Precedent.—Opposition to the Completion of the East River Bridge.—The Financial Management of the Enterprise.—The Illinois State-House.—Who is the present Architect of the Rockford, Ill., Court-House?—The Forty-second Street Tunnel Accident.—The Condition of our Forests.—European Schools of Forestry . . 17

NOTICE OF THE FOURTH COMPETITION IN INTERIOR DECORATION 19

THE ILLUSTRATIONS:—
Monument to Henri Regnault at Paris.—Design for a Town Hall at Milton, Mass.—Designs for Fireplaces 21

ARCHITECTURAL COPYRIGHT 21

CORRESPONDENCE:—
Letter from Rome, Italy 22

COMMUNICATION:—
Whither are we tending? 23

NOTES AND CLIPPINGS 24

THE commissioners of education of the city of New York, in their capacity as trustees of the College of the City of New York, have, after careful consideration, voted, by a majority of ten to four, to create a professorship of architecture and the arts of design in that institution. We are led to understand that the opposition to this scheme was based upon the theory that the establishment of such a special department would be inconsistent with the general education and culture to which the curriculum is devoted; that it would be the creation of a sort of technical school within a college properly devoted to the liberal arts, adding new expenses and imposing embarrassing responsibilities. We are not informed whether the new department is intended directly to create architects, or whether its functions are to be similar to those of the Chair of the History of Art in Harvard University. In the latter case it cannot be doubted that the duties of the new professorship will be entirely consistent with any scheme of generous culture. The neglect of art as an illustration of history and ethnology, and as the sister of literature in its relation to the study of the mental progress of mankind, is one of the most noticeable defects in the higher education. The results of this neglect are evident from the fact that the important testimony of architecture and the arts of design is never duly acknowledged in historical works, and that a knowledge of the growth of styles and of the development of schools is not recognized by scholars and men of letters as an essential part of their equipment. The chief value of the historical essays of Freeman is mainly attributable to his exceptional respect for this neglected but singularly significant department of human achievement. It is evident, moreover, that architects can never work to good advantage, can never produce really great work, without a far closer sympathy and a far more intelligent encouragement than they at present obtain from cultivated men; and we believe it is no exaggeration to say that to the entire absence of this Athenian sympathy and encouragement may be attributed the unsatisfactory condition of modern architecture. The tendency therefore to include this study as a part of liberal education we consider no unimportant step towards the perfecting of knowledge, and we heartily congratulate the College of the City of New York for this wise action on the part of its trustees, and for its good fortune in having obtained as occupant for its new chair an architect so accomplished and in every way competent as Mr. Russell Sturgis. And we may compliment Mr. Sturgis also upon the greatness of his opportunities.

WE have authority for stating that the Secretary of the Interior regards the Patent Office competition as an experiment to ascertain the practicability of obtaining designs for public buildings by general competition among architects. Although only a certain number of architects have been invited, practically, we suppose, the competition must be an open one; and therefore the authorities cannot properly commit themselves to the assurance that the author of the successful design will be employed as architect of the work, or to prepare the working drawings. Such employment must of course depend upon the repute, resources, and experience of the fortunate competitor. If he is not known, or if his experience has been insufficient, the public interests cannot be entrusted to his hands without a risk which the authorities should not incur. It is to be hoped that because this experimental case is an experiment to the architects as well as to the Government, the Secretary can find it consistent with the public interests to employ the author of the selected design to prepare the working drawings; if he cannot do so there will be great danger that most architects of position and character will hereafter avoid an arena apparently so barren of solid rewards. Of course the success of the experiment, as regards the interests both of the public and of the profession, must turn upon the ability and judgment of the advisory committee of architects; and we cannot but think that if the selection of its members were deputed to the executive committee of the American Institute of Architects, it would not only be less liable to contain any doubtful element than if appointed without such assistance, but would inspire the competitors with confidence in the impartial character of the decision. In all such cases, there must necessarily be a large amount of labor, money, and time expended in vain by the competitors, and it is therefore reasonable and expedient to give those who are willing to run the risk every practicable assurance of fair play. Indeed, without some such assurance, the whole project must become a mere game of chance, in which the odds are enormous, and in which no respectable architect would take a hand. Since writing the above we have learned that the Secretary has already, by telegraph, invited a jury of three responsible architects from various parts of the country to meet at Washington on Monday next, to consider the designs submitted.

THE Council of Political Reform in New York, which represents the interests of the tax-payers in that city, and aims to prevent the unnecessary increase of the municipal indebtedness, has at length begun a contest to stop further appropriation for the great East River Bridge. In so doing, the Council doubtless gives voice to an increasing feeling among property owners in that city that the time has come to decide whether it is not after all consistent with the public interests to stop further expenditures and abandon this gigantic enterprise. The movement is a very serious and respectable one, although the work is almost sufficiently advanced to afford passage for foot traffic. The principal points made against it are, first, that it is virtually in violation of the laws of the United States, prohibiting the obstruction of navigable rivers; second, that it will prove a very serious obstruction to the commerce of the port, and therefore a very serious injury to all the wharfage property above the bridge; third, that the trustees are violating the law which created them in greatly exceeding the amount of money which they were authorized to expend; fourth, that it will bring no material return of profit, directly or indirectly, to the city, and that the share of New York in the cost will be paid to her detriment in many ways; fifth, that the access to the bridge from the city requires a succession of enormous piers and arches, which will destroy a large amount of tax-paying property, and will ultimately render necessary the making of new streets and the re-adjustment of the plan of the city in that neighborhood; sixth, that in accordance with the opinion of Mr. Roebling, the engineer of the bridge, it cannot safely be used for the passage of trains (see *American Architect*, pp. 190, 214, vol. iii.). These points are sustained by a very imposing array of specifications. More than 17,500 sea-going vessels entered the port last year, all having masts above the height which can safely pass under the cables; and of the 10,500 coastwise vessels which passed under the bridge last year, a large proportion will not be able to do so ultimately without housing their topmasts,—an operation which, especially with small crews, will be attended with great expense and inconvenience, thus showing that practically the bridge will prove an obstruction to navigation within the meaning of the laws of the United States. As regards expense, the original estimate of three millions of dollars has been successively increased to eight and twelve millions; and now it is quite impossible to fix any limit of cost, some estimates placing the total as high as twenty millions.

As a financial exhibition this Brooklyn bridge, a new Colossus of Rhodes, is equally curious, whether it demonstrates the

imperfection of scientific estimates, or shows how, as was the case with its classic prototype, a great public monument may be so managed as to divert no small part of the money given for its erection into the pockets of its projectors. Many of the points above mentioned are in the nature of legal questions, pending the decision of which by the courts the Council of Political Reform urge the suspension of work, that the money now going out may be saved to the city in case of a decision adverse to the completion of the structure. Meanwhile a corresponding movement has been made in the Common Council — apparently inspired, however, by political influences — against any further subscription by New York towards the bridge, on the ground that the second appropriation, that of eight millions, was inclusive of and not additional to the four and a half millions which had already been expended up to the date of that appropriation; and that the appropriation itself was unconstitutional, in that it violated the provision that "no city shall incur indebtedness except for the purposes of such city." Charges are also made against the management of the work. Doubtless these points and charges, general and special, will be promptly and vigorously met by the friends of the bridge, and we shall be interested to know by what arguments they will enforce and defend the *status quo*. There are elements of cost in every great work of engineering and architecture — elements frequently arising from exceptional and unprecedented circumstances, or from conditions which cannot be foreseen — which tend to make all preliminary estimates for such work factitious, however liberally such contingencies may be allowed for in the contract. But the present advance from three to twelve millions or more seems far too great to be explained on general principles.

If the colossal piers of the East River Bridge are destined to remain unfinished monuments of an enterprise too incautiously undertaken or too extravagantly conducted, they will be matched by the uncompleted pile of the unfortunate Illinois State-House; and both may, in their way, serve as illustrations of the manner in which the New World seems to follow the mediæval cathedral-builders in not counting the cost of its great undertakings. Europe is full of these "broken promises," and our own country may yet be decorated with a melancholy series of unfinished monuments, exhibiting in language unmistakable our national tendency to great conceptions and to indifference or carelessness as to the cost thereof. We have had occasion (see *American Architect*, p. 35, vol. iii.) to state that, in the beginning of the year, work on the new Illinois State House entirely ceased because the people of the State, by a vote of 300,000 to 80,000, refused to ratify a proposition, submitted by the legislature, to make an additional appropriation, amounting to $531,712.18, to complete the building. The amount limited by law for the completion and total cost of the structure, namely, $3,500,000, has been entirely expended, and a deficiency of some $800,000 remains, a result indicative of scandalous incompetency on the part of the commissioners, or of yet more scandalous lawlessness and extravagance. Our national tendency to indifference as to cost, to which we have alluded, could not have received a better illustration than in the conduct of the governor in not dismissing the commissioners, and in the conduct of the legislature, which, instead of impeaching them for this shameful breach of trust, protected them with disgraceful apologies, and appropriated more than half a million of dollars to justify their wastefulness and complete the work. But the judgment of the people upon the conduct of all concerned was clearly expressed in the popular vote by which the appropriation was rejected. It is now understood that the governor proposes to avail himself of a provision in the law authorizing the construction of the building, by which he is empowered, in case of such an adverse vote, to submit the question again to the people at any subsequent general election. But it is safe to say that the people of the State will never vote another dollar to be expended by a commission which has proved so faithless to its trust, and that the building will remain in its present condition until perhaps a new commission of tried and competent men shall have been appointed to control its completion. In view of the readiness with which these great structures are permitted to create colossal debts for the people, it is hardly surprising to see the state-house commissioners of the adjoining State of Indiana shifting upon the shoulders of poor Mr. May, the architect, the entire responsibility for the satisfactory completion of that building within the present contracts, and holding him to a stern fulfilment of their trust by the imposition of heavy bonds, out of which are to be paid all extra costs incurred over and above the contract price. Happy the State possessing an architect so willing, for nominal pay, and without proper control over the work, to insure the commonwealth against a state-house debt unprovided for in the original law!

On the 8th instant, in the town of Rockford, Ill., Mr. Henry L. Gay, architect of the ill-fated court-house there, surprised the county commissioners by appearing before them, at their regular session, and reading a statement in which he set forth his claims still to be considered the architect of the building, there being nothing on record indicating his discharge from such functions, and charged the contractor, Richardson, with criminal carelessness and malfeasance in the execution of the work. He specified that the fall of the dome was directly attributable to the unauthorized reduction made by the contractor in the size of the supporting pier, and to the employment therein of material inferior to that specified in the contract; that the conduct of the work, over which he had not been allowed to have proper architectural supervision, had, unknown to him, been marked in other respects by a shameful disregard of plans and specifications which sufficiently provided for good building. He protested that the new contract which had been made for the completion of the building was extravagant, and included many items of expense which had already been paid for; that it was a shameful imposition upon the county; and that the architect had not been consulted in any way. These charges were denounced by the superintendent, Jackson, as falsehoods, and were "hurled back" in the usual manner; but it is evident that a fair and impartial examination should follow upon them, so that Mr. Gay may have a fuller opportunity than heretofore to define his position with regard to the building. We have never sought to screen the architect from the fullest responsibilities which could properly be laid upon him professionally, but the conduct of the board, which, by the bye, declines to give Mr. Gay's statement in full to the press, and of Mr. Richardson, the contractor, in modifying essential features of the architect's plans without his concurrence, lays upon them, as we have always said, a very heavy burden of blame. Mr. Gay is the greatest sufferer, though he is by no means the greatest criminal. He really seems to have been treated throughout with a contemptuous neglect, which cannot but demand a certain amount of sympathy from us, and for certain errors of judgment in the planning of the building, as pointed out by General Smith, the engineer of the committee of experts, before which he was not asked to appear, he suffers the grievous penalty of loss of professional repute. He should therefore be allowed, we think, the fullest and most public opportunity to substantiate his case. He should be promptly relieved from every blame which cannot justly be laid at his door.

The evidence before the coroner's jury in the case of the fall of the arch of the tunnel connecting First and Second avenues under Forty-second Street, New York city, seems to indicate a fault, first, in the designing of the elliptical arch, and in the specifications thereof, the height of ten feet in a span of forty, although not unprecedented, being unusual and requiring a much higher standard of materials and workmanship than was called for; second, in the supervision and inspection of the construction, which was unscientific and careless; and, third, in the execution, which, although good enough perhaps for common work, was by no means good enough for a work of scientific engineering, especially in the matter of loading, which was done irregularly and in such a manner as to betray the shaky construction and to procure its early fall. The verdict of the jury, instead of attaching the responsibility for the catastrophe to that high functionary, the Commissioner of Public Works, Mr. Allan Campbell, from whose office the design emanated, and under the eye of whose representatives it was erected, mildly blames the uneven loading of the arch by the contractor, and the superintendence of this part of the work by Inspector O'Brien, who did not order a change in the overloading as soon as he saw it. The subordinates are the commissioner's scapegoats, selected to bear the responsibility. Where it really belongs must be evident to any one having any knowledge of the circumstances. Thus another opportunity for pointing out and punishing the real offender in a case of bad designing and bad workmanship is allowed to pass by, and the public is not profited by the admonition of a high example.

Two years ago, when the chords of sentiment and patriotism were vibrating to so many impulses, it was suggested — and possibly the suggestion was, to a limited degree, carried into effect — that at the proper season of the year each person should plant a "centennial tree." Such a step as this could not have had a very material effect in restocking our already somewhat depleted forests, but it was a movement in the right direction. The great forest fires in the spring and autumn, and the thoughtless and reckless cutting and clearing done by individuals, as well as the unprincipled depredations of the timber thieves, which have been brought to light so recently, are rapidly bringing this great continent with its vast forests to the condition of those European countries in which the same tree is often made to supply fagots to several generations. Some of our state legislatures have felt the need of doing something to repair this waste, and have already passed laws looking to a systematic replanting; foremost among these is California, which, considering its population, its great trees, and its comparatively recent settlement, might be expected rather to follow than to lead in the matter of arboriculture. Michigan has a State Forestry Association, commenced by the legislature, which awards prizes to those who plant the greatest number of trees on "Arbor Day;" and Massachusetts has, we believe, done something quite lately in the same direction. The statistics, variously obtained, concerning the growth and uses of wood are significant and little reassuring. Those who read an article we published some little time ago, on the ways in which wood is consumed, will not be surprised at the statement that, at the time of the last census, there were in this country about one hundred and seventy thousand manufacturing establishments in which wood was used. The forests in the United States which supply this incessant demand are estimated to cover about one fourth part of the national domain, or, roughly, about six hundred million acres. North Carolina has the largest proportionate forest area, and California the least; and it is said that the woods of Mississippi, though extensive, if drawn on exclusively by all the States would be entirely consumed in five months. The consumption of wood as fuel has of course much to do with this enormous depletion; for instance, it is said that ten thousand acres of woodland were stripped of timber to supply the fuel market of Chicago for one year. The Government, however, is not entirely neglectful of its obvious duties in this emergency, and the Commissioner of Agriculture has lately published in his report many facts, statistics, and suggestions, which, if they could be brought to the notice of the proper persons, would do more real good than often falls to the fate of government reports. The facts all tend to show the necessity of prompt action. As a first step the report recommends the establishment of special government schools of forestry at suitable points. Much also might be done by attaching to the already organized universities and technical schools chairs of forest science.

SCHOOLS OF FORESTRY are in Europe a growth of this century, and among the nations which support them are Germany, Austria, France, Italy, Russia, Portugal, Spain, and Sweden, although the titles under which they are organized and the studies pursued in them are often quite different. In Germany there are nine institutions where forestry is taught. The chief of these is the High Institution of Forest Science at Neustadt-Eberswalde, where the average attendance has been for forty years somewhat over fifty pupils, and the number of hours required to complete the course of instruction is 2,648. The curriculum of studies, which might well be copied, embraces the cultivation and protection of forests, the study of statistics, the jurisprudence relating to forests, the surveying, measuring, and valuing of woodlands, as well as road making, draining, public economy, and finance; it also includes the special studies of botany, vegetable physiology and pathology, geology, geodesy, geognosy, mineralogy, and meteorology; and the more common studies of chemistry, physics, microscopy, and zoölogy. Thus it will be seen that the graduates of the school leave it well equipped for the work the State expects from them. To obtain entrance to some of the schools a year's apprenticeship under a skilled forester is a prerequisite. France has had a similar school at Nancy since 1825, which receives pupils in proportion to the demands of the state forest service. It averages about twenty graduates a year. England, seemingly, does not have a demand for such skilled persons, possibly because the crown-lands are not large enough to require the establishment of a government school to provide them with foresters; but as there is great need of such trained persons in India, an arrangement has been made with the French Government by which three or four English students are each year received at Nancy and trained for service in the Indian forests.

NOTICE OF THE FOURTH COMPETITION IN INTERIOR DECORATION.

THE subject of this competition, as given on page 188, vol. iii., is as follows: "A chimney-breast and stone fire-place situated at the end of a dining room in a city house. The room is thirteen feet in the clear, and is sixteen feet wide; the chimney-breast is five feet wide; the fire-place may be used for wood or coal fires. Required half plans, taken through the fire-place and above the fire-place, an elevation and section, with details to a larger scale."

Nineteen designs have been received, and on the whole the competitors have succeeded in maintaining the standard of thought and workmanship established in the previous competitions. The third competition was remarkable as indicating the influence of the latest school of English design upon the younger, and therefore the more receptive minds in the profession here, scarcely one competitor having failed to acknowledge his allegiance to the "free classic" according to the light that was in him. The contents of the present portfolio indicate a less restricted and a more intelligent use of precedent.

Although the order in which the following notices appear is intended roughly to indicate our opinion as to the relative rank of the competitors as regards the question of design and rendering, we have in several instances found it convenient to group designs independently of absolute merit, in order to present a more symmetrical statement of the competition as a whole. This arrangement is entirely independent of the judgment of the committee. It is to be observed that the provision of the programme relative to width of breast has not been observed by several, and that requiring a "stone fire-place" has evidently not been understood by half of the competitors.

"*Hope*" (with an anchor) and "*Abacus*" submit studies of nearly equal merit in conception and execution but of very different *motif*; the former presents a very effective rendering of a late French Gothic chimney-piece, giving indications of a conscientious study of the pages of Viollet-le-Duc both in idea and in method of presentation. Stone and wood are intelligently combined, the style is nowhere suffered to incommode modern usages, the chimney-piece is well married to the wall and ceiling, the carving in panels and canopy is well suggested, and the characteristic *boiserie* of the style is presented with spirit and elegance. But a more careful study of the peculiar moulded scroll panels of the period is needed, the examples of this feature in the long upright panels being neither well drawn nor properly understood; the manner in which the moulding is chamfered in the detail drawing is, in execution, impossible. The bracketed shelves on the returns of the breast would have been far more effective if more closely allied to the treatment of the breast itself. But, nevertheless, we consider this a very meritorious composition; and so is that of his nearest competitor, "*Abacus*," who contributes an elegant study in French Renaissance with a delicate full Doric order and entablature of mahogany, ingeniously carried across the recesses on either side of the breast and around the room; the details have the great virtue (in American work especially) of temperance and self-restraint, but the general idea is sufficiently original to protect the design from the charge of being merely *comme il faut*. There is however a touch of national enterprise in the treatment of the ceiling and cornice of the room, which latter is connected with the entablature aforesaid by a bold conge, making a dangerous load for the slender cedar beneath. The idea is ingenious, but we fear it would prove perilous in execution. The conge is a mistake in such a place; it gathers visible dust and connects features which in fact should be separated. The delicate ceiling beams need some architectural expression of connection with the flatness of the ceiling. The vertical treatment of surface in the wall-paper competes unhappily with the slender columns and pilasters. This is a case in which the color should be applied in styles and panels or in damask stamped patterns or arabesques, opposed to the whole movement of the columns, so as, by contrast, to assist in their characteristic expression and not, by competition and likeness, to detract from it.

"*Advent*" presents us with a drawing, the merit of which resides in the execution, which is clean, clear, and vigorous, and in the accessories, which are bright and clever, rather than in the chimney-piece itself, which is a fair example of the fashionable "free classic" or Jacobean style, but without striking points of excellence or invention. The crowning feature of the chimney-piece over the mirror is wanting in unity and interest, and has no proper and essential connection with the substructure. In geometrical elevation, the part below the mantel-shelf, is, apparently, the best part of the design, but a perspective would betray how fatally the shelf overhangs and conceals what is immediately beneath; there is no provision in the design for this practical obliteration of a large part of the surface. The stone fire-place should have been brought forward at least six or eight inches, and there is nothing in the design of it to warrant the costly complication of its construction by increasing the three stones, of which it should have been made, to twenty-seven. A work which, like this fire-place, is easy to design but very costly to build, is a sign of degenerate architecture, and no true artist will willingly allow such a disproportion between the head-work and the hand-work. If he

has money sufficient to lavish on such details he should bestow a commensurate amount of thought upon them. "*Voltaire*," in this competition, has shown what may be done with a similar *motif*. The reflection in the mirror is impracticable, and the shadows are not correctly balanced; thus the recesses under the cabinets and those on either wing of the chimney-piece should be marked by much deeper shadows. The execution of this design is so firm and brilliant, and the design of it in parts, especially in the treatment of wall surfaces, is so good, that the author must be held to a stricter accountability than many of his competitors. We would only add that his twistest shafts should, by a contrary direction of the spiral, balance each other on the two wings. This fault of detail is evident in several other designs in this competition.

"*Arisez le fin.*" This is a monumental Jacobean design, very well put together and vigorously drawn with a clear, firm touch, but the massive and well-composed balustred pilasters of marble which flank the fire-place should have had a more exact relation with the coupled pilasters of the chimney-piece above; their central lines should have coincided, and the mantel-shelf should have been broken around it with slight returns so as to render visible the decorated quarter-round moulding beneath; as it is, this feature must be lost in the centre under the projection of the shelf; the frieze is good, but its double angles should have been carried up into the coved cornice, which should not have been left to overhang at the corners. This design is very architectural in its general treatment, and for that reason, though it is perhaps presented in a less striking manner, we are inclined to prefer it to that of "*Ideent.*"

"*Fra Diavolo*" gives us a veritable *chemineé* in marble of pyramidal form above the shelf, with detail too coarse and archaic for interior work and insufficient in quantity; the mantel shelf is really six feet high, but its treatment is rather suggestive of three and one half feet; it is inconsistent with the finer domestic life of modern times. But, in ideal, it is frank and manly, and it is rendered with a dash and confidence which cannot but interest one in the hand which did the work and the mind which conceived it. He boldly gets over the difficulty of reconciling the monumental material of his chimney-piece with its surroundings by extending the marble treatment to the whole end of the room, but this device only transfers the difficulty to the corners of the room and to the junction of the wall with the ceiling; the thing is not badly managed, however, as it is; we commend this bold aspirant to a study of such detail as the first-named competitor has adopted with excellent results. Civilization has its refinements, and these must be provided for by the architect even if he thinks it necessary to adopt a style better suited for the castle of Front-de-Bœuf than for the residence of a scholar and gentleman of the modern type.

"*A Novice*" (there are two of this signature) presents a compact little design and one not without points of ingenuity, — a panelled chimney-piece slightly overhanging successively in four well-divided stages. The deeply recessed division over the mantel shelf suggests a bellow breast above, and the inference is that the picture which occupies the central panel above swings on its hinges and is capable of betraying romantic mysteries in the depths behind. But the capacity of this design is not realized in the details of its execution, which need study and experience fully to develop them. The little bracketed shelves are awkwardly placed and the panelling is crude; but the cornice over the whole is a good crowning feature.

"*Albon's*" design covers his chimney-breast in what would be vulgarly recognized as the Eastlake style, and is remarkably well presented in his perspective. The metal brackets supporting the upper shelf and the candles are ingeniously contrived, and on the whole the best capacities of the very modern phase of the Victorian Gothic are as well set forth in this study as in any that we have seen. The manner in which the panel over the mirror is occupied is affected and does violence to the space it would decorate. The relations of the chimney with the ceiling through the coved cornice and the beams are very well managed. As a matter of composition this design is in advance of those of "*Fra Diavolo*" and "*Novice*," and the draughtsmanship of the perspective is not excelled by any of the competitors.

"*Fairdeal*" presents us with one of the two recessed chimney-corners shown in this competition. It is an English classic design with a three-centered arch over the recess, starting from a continuous impost which is in the form of a full entablature supported by pilasters; this arrangement, in order to provide for the arch, renders necessary a frieze space above of disproportionate width, dividing the wall-space very awkwardly indeed. The chimney-corner recess, as is the case in almost every modern interpretation of this feature, is far too small, and no one but a salamander could occupy the benches when a log was blazing on the hearth. A red brick chimney-breast with stone dressings and cornice is better suited for a hall or a public place than for an inhabited room, and the three lancets by which the breast is pierced over the shelf are in depth of mullion a *tour-de-force* of design which is not justified by the results. The drawing, though cautious and, indeed, feeble, indicates an earnest intention; the chimney-breast proper is wanting in detail and shadow; if some of the courage which has been wasted on the three cavernous and ineffective lancets had been bestowed upon the crowning pediment and upon the mantel below, the composition would have been far more valuable and effective.

The author of the design marked "(?)" occupies the recesses on either side of the chimney with panelled buffets of monumental character forming a dado and superdado, and surmounted by an order of Ionic pilasters forming the wall-screen, with painted panels between, a full entablature and a broad frieze, — all very formal and stately. This classical composition, when it is carried across the chimney-breast, is readily developed into a frontispiece, over-bold in projection and crude in some of its details, but such perhaps as might have been seen in some manor-house of the time of Charles II., before the capacities of the orders for a light interior treatment had been worked out. The design is in outline quite correct and careful, and the author of it is in a fair way to better things. For interior work he has to cultivate a lighter, a more freely imaginative and graceful habit of thought than is here indicated. He seems to "know his orders;" and this is certainly a solid advantage; with this possession he can advance into the regions of fancy with far greater profit than some of his competitors, who are already there expatiating, each after his kind, but who are by no means so well grounded in this primary knowledge.

"*Voltaire*" here presents us with the well-known Jacobean forms according to Bernard E. Smith, with perhaps even more of the mixture of Chinese *grotesquerie* which distinguishes some of the lighter designs of the Englishman. It certainly is rather a composition of furniture than of architecture, although the basis of it all, the fire-place, is of good masonry, and each stone of it is rusticated with a carved design in low relief. The close pattern of the wall-screen on either side is rendered so heavily and relentlessly that the design of the chimney-piece, in itself light and frivolous, is well-nigh lost.

Another "*Hope*" here makes his appearance, with a very monumental design of Jacobean character surmounted by a steep gable; the details are not elegant or scholastic or, indeed, interesting; there is an absence of harmonious contrasts in the proportion and an unfortunate similarity of vertical dimensions in the orders below and above the mantel-shelf. If the middle division had been enlarged at the expense of the order of arches which surmounts it, and had been separated from it by a more pronounced horizontal feature, if the arcade had been furnished with a *raison-d'être* by having in each niche something more significant than a chamfered projecting panel, and if the pediment in its bold outlines had received some touch of grace not recognized in Vitruvius, this design might have claimed a higher place in the list. The wainscoting and wall-screen on either side have no unity with the central feature, are no more fortunate in their proportions, and the decoration of the wall-screen is far too coarse and large. A very small alteration of proportions would go far to redeem this design.

"*Dolce Dulci.*" This is a less grammatical, but a more interesting and ingenious performance. It has some good bits of detail, especially in the carving, but as a whole it is wanting in lightness and grace. It has a very generous arched fire-place of rough masonry, — too rough for the gentle life which it is intended to comfort, — and this masonry is framed with wood panelling, crude and unstudied in character. The superstructure is not without elements of good design, but it has no relation whatever with the parts below. The corbelled shelves on the returns are good points, and if the disjointed composition had been united and reconciled at the top with a good crowning feature, we would have had a far better whole. The author betrays a straining after originality without the necessary foundation of correct taste; he has knowledge, apparently, but is wanting in judgment. If he should apply to his general outlines the same rules of design which would guide him in an architectural façade, so that each detail would become an essential part of the whole, he would be surprised to see how fundamentally his composition would be changed.

"*Acanthus*" on the other hand has so applied his architectural rules, but the butterfly of his fancy is broken upon the wheel, and his room is overpowered with a structure which with no great changes might serve for a funereal monument. Much of this effect might have been avoided if the central division over the shelf had been made narrower and a greater contrast of proportion introduced. It is a fair composition, however, in Italian Renaissance, and is in many essential respects commendable. It is not well to add wooden wings to a stone centre with the same continuous mouldings. The open canopies by which the design is flanked above are bold but bald in design; a panelled back would have reconciled those little porticoes to their domestic uses, and we are disposed to think that if they had been connected with the ceiling and if the main cornice had been broken around them, the result, if less original, would have been safer and more elegant. This aspirant is on the right track.

"*J. (4–11–44) P.*" This is another recessed chimney-corner, somewhat similar to that of "*Fairdeal*," but inferior in design and drawing. In the latter regard the work is careless and scratchy, and the absence of shadows places the author at a disadvantage. The recess is far too narrow for its depth, the settles could not be occupied with a fire on the hearth, and the want of scales leaves much to be explained. The wall surfaces are very badly cut up; the fundamental principle of design for the treatment of wall surfaces is to subordinate the parts to one predominating feature; here there is a dado, a wall-screen, and two friezes, all of nearly equal importance in the composition. The plans do not explain the elevation, and the intentions of the author are by no means clearly set forth. The chimney-piece is on too small a scale to be carefully studied, and it

would be impossible to give an estimate of cost, because of the absence of the necessary information as to detail.

"*Morgenstunde*" is far better than his predecessor in drawing and composition. He presents a design with some crudeness of details, but capable of execution and easily understood. The arch of the fire-place is of joggled stones, in buff and red, fairly studied, but the shelf above would in perspective need visible mouldings underneath. The chimney-breast is meagre in design, and the cove above is without the necessary cornice mouldings. The chimney-breast has an unexplained and awkward enlargement over the top of the cove. The design seems on the whole to be conscientiously considered, but the author needs experience.

"*Hard Work*" justifies his signature with a drawing very carefully elaborated and a design with some good points. For the required stonework of his fire-place he has, like most of his competitors, contented himself with an arch of very small *voussoirs;* this is surmounted by a thin shelf, whose supporting brackets would be invisible in perspective. The superstructure embodies an idea capable of good treatment, but, as presented, it is crude and inelegant in detail, and shows a mind unused to the language of forms; the balusters used below and above the mantel-shelf are badly designed and the shadows are incorrect. A perspective study, in this case as in many others, would have betrayed to the author the most obvious errors of his design.

"*A Novice*"—the second of the title—gives us a very careful and very serious composition, too massive and heavy for the place it would have to occupy in the household. The detail is quite out of scale, and the features all too large; he has also, in common with many others, committed the error of continuing in wood the marble details of his mantel. The design needs detail and refinement, but the outlines of it, though coarse and crude, are correct.

"*Walpurgis.*" This is a brave little effort in a sort of bad German Gothic, but very carefully drawn and full of elaborate detail; it is on a higher grade than that of its predecessor. If the author had defined his shadows with vigor and precision, his ideas would have been far more effectively presented; but at best the design is as frivolous and whimsical as that of "*A Novice*" is serious and bare. Between these two designs lies a great region in which are many forms of truth. If "*Walpurgis*" had shown a greater reserve of imagination, and his immediate competitor had given reins to his, both works would have been better for the discipline. Detail which is merely capricious and whose presence cannot be explained is inconsistent with the dignity which must have expression in every work of architecture.

"*Peter*" is another *Novice* with a crude and illiterate design, in parts badly out of scale, and sadly wanting in detail and imagination. But the composition is by no means hopeless; it has promising parts. The window-sill is far too high from the floor. The drawing is also the work of a novice.

THE ILLUSTRATIONS.

MONUMENT TO M. HENRI REGNAULT AT THE ÉCOLE DES BEAUX-ARTS, PARIS. MM. COQUART AND PASCAL, ARCHITECTS; MM. CHAPU AND DEGEORGE, SCULPTORS.

AT the *Salon* of 1874 there was exhibited a partially finished, nearly lifesize figure *of la Jeunesse*, sculptured by M. Chapu, now member of the Academy, of such surpassing beauty and grace that no opposition was made to its receiving the *prix d'honneur*. This statue was to be one of the accessories of the monument to the young painter, Henri Regnault, and the other pupils of the École des Beaux-Arts who fell during the war of 1870–71, which has been placed in the court of the Mulberry Tree at the École des Beaux-Arts. M. Henri Regnault, whose works are familiar to all visitors to the Luxembourg Palace at Paris, was exempted from military service by reason of being a pensioner of the Academy of France in that he had gained the *Grand Prix* in the section of painting. Nevertheless the enthusiasm which during the Franco-German war fired the real patriots of France led him to enlist, only to lose his life at the battle of Buzenval, thus closing a career already marked with unusual promise and success. The monument, which we here reproduce from "l'Encyclopédie d'Architecture," was erected partly by private subscription and partly by government aid. The bronze bust of young Regnault which surmounts the pedestal was entrusted to M. Degeorge; the architecture of the composition was the care of MM. Coquart and Pascal, while to M. Chapu belongs the honor of creating, what must always be the point of chief interest, the figure of *la Jeunesse;* which we shall always regret was not left semi-finished as it was at the time of its first exhibiting, when one was at liberty to interpret at will the tender yet sad enthusiasm of its face, and to take delight in the grace of its pose unaffected by thoughts of death and battle.

DESIGNS FOR A STONE FIRE PLACE, — COMPETITION NO. IV.

Nineteen designs have been submitted in competition in accordance with the programme announced for the fourth competition. The jury has decided to award the first and second prizes to the designs distinguished by the motives "Hope" and "Hope" (with an anchor) respectively. To the design by "Acanthus" an honorable mention is awarded. We must once more call the attention of those who take part in these competitions to Regulation No. 9, which says: "The limits of the drawings must in no case exceed 16½ inches in length by 10½ inches in breadth." As we are much troubled by receiving drawings which are not only larger but also smaller than the prescribed size, we will reinforce the regulation by saying that we wish all drawings to be of the exact size mentioned in the regulation.

COMPETITIVE DESIGN FOR A TOWN HALL AT MILTON, MASS. MESSRS. WARE AND VAN BRUNT, ARCHITECTS, BOSTON.

ARCHITECTURAL COPYRIGHT.

ALL good things, say the Germans, are three. There are three things, therefore, which it is understood the architectural world in its highest form of English development has long been earnestly desiring. The first is the practice of high art. The second is the protection of that high art by law of copyright. The third is the distinction of the high artist by an academical diploma. It need scarcely be pointed out that these three propositions hang very much together. Grant any one of them and the other two follow. But at the same time it is almost equally clear that, if either of the three can be supposed to be effectually disposed of, as being incapable of practical recognition, neither of the others will be likely to succeed in being so recognized. Admit the high art, and it is worthy of both copyright and diploma. Admit the diploma, and it may be said to presuppose the high art and the title to copyright. Admit the copyright, and it would be very much of a farce if it were not worthily earned by merit and accompanied by honor. On the other hand, if there be no high art, why the personal distinguishment or the dread of piracy? If there be no recognizable title to academical status, why make a fuss about the value of the work? And if there be no copyright — well, some appear to think that, if there could be, we should soon see the designs of our architects exhibiting something more worthy of preservation, and their value to the public becoming a matter of more honorable recognition for the individual.

The general principle of copyright is one that commends itself alike to common sense and to common honesty. Everybody has heard of "the petition of Thomas Carlyle, a writer of books," which was presented to the House of Commons nearly forty years ago. Recounting briefly the laborious nature of an author's task and the uncertainty of his reward, he sets forth the issue as regards obvious proprietorship in a way that is so plain as to be incontrovertible, even if there be a little in it of the accustomed jocularity. He prays the legislature, in short, "to forbid all Thomas Teggs and other extraneous persons to steal from him (and his) his small winnings for a space of sixty years at shortest;" and he is willing to consent, if required, that "after sixty years they may begin to steal." The sturdy intelligence of the petitioner cannot ignore the obvious fact that there is stealing of some sort in the transaction to the last, but in deference to human weakness he will wink at the theft if it be postponed in decency to a period reasonably remote.

The principle of patents for inventions is not exactly the same as that of literary copyright. The inventor does not seem to be authorized to consider his invention as a property which is his own by axiom. If he thinks he can keep the secret of it to himself, he is welcome to try. But if he does not succeed, the law somehow declines to protect him in its use. He is, therefore, authorized to reveal it as an act of contract with the public; and in consideration of the price thus paid, in the form of conferring a public benefit, he is endowed with a statutory right of monopoly in manufacture for a certain term of years. The public benefit in question is, in a word, the communication to everybody — and it must therefore be fully and unreservedly done — of the scientific knowledge involved in the invention; and so jealous is the law with respect to other people's freedom of discovery that if any rival inventor or other "extraneous person" can but pick a technical hole in the patentee's title, he will find himself amply encouraged to "steal" what he can.

The registration of patterns in articles of artisan design is still another different thing. Even in the most artistic subjects of this class the idea which is in the legal mind seems to be that the designer shall simply be protected in the manufacture of copies of the precise article which he presents to the public authority for identification. The copyright of pictures and sculpture is similar to this. Other painters and sculptors cannot be prevented from even "slavishly imitating" these works (as the phrase goes) artistically, but they are not in principle allowed to reproduce them commercially. Both the artisan and the artist, therefore, are thus protected in the monopoly of their designs upon at least a simpler principle than that which is applied to the inventor of a new machine or a new quack medicine, and almost in a more intelligible way than the author of a book or a poem is dealt with. The case of stage-plays is, on the whole, not difficult to understand; but when the copyright of a song is made to go so far that nobody dare sing it in a public hall except on payment of an arbitrary royalty to the owner of the plates of the music, this might provoke a little argument if it were of sufficient importance.

How, then, does the case stand with regard to the drawings of an architect? In what way is there in them any design that is recognizably novel; any discovery that it benefits the public to have revealed; any article of manufacture whose value can be appraised commercially; anything that can be performed in public for the per-

former's profit; anything upon which a royalty can be made payable; anything which the Thomas Teggs of the brick-and-mortar world can steal and sell, as Carlyle plainly implies, to receivers of stolen goods? To answer this it is necessary to look dispassionately at the process of architectural composition.

No one will pretend to say that "the poet's eye in a fine frenzy rolling" is strained eagerly over the homely drawing-board, or the rapt musician's fingers clasped ecstatically upon the honest T-square, or even the pencil of a Millais or a Leighton swept breathlessly across the animate canvas, as Mr. Barry, R. A., or Mr. Street, R. A., himself, "with head awry and curious eye peeps knowingly" into his portfolio of photographs, or explores, at least in the latter case, his teeming sketch-books. Still less will it be imagined, even by the most courteously credulous of admirers, that the mysteries of scientific contrivance in St. Thomas's Hospital, or in the premises of the National Safe Deposit Company, have been evolved from the inner consciousness of Mr. Carrey or Mr. Whichcord with many agonies of intellectual parturition. When Mr. Norman Shaw, R. A., obligingly communicates to the public an excellent trick of fence in respect of the sweetening of soil-pipes, or Mr. Waterhouse, A. R. A., expounds his way of using terra-cotta to the heart's content, at last, of Sir Henry Cole, few, if any, will be found to have so little knowledge of the world as to attribute to those promising artists a vast amount of the peculiar merit attaching to a Siemens or a Bessemer. If, again, we look attentively at the Government Offices in Parliament Street, or contemplate with awe the Manchester Town Hall, or gaze affectionately upon Keble College, or even marvel exceedingly at the cathedral restoration of Gloucester, or Bristol, or Dublin, or gape in amazement at the Albert Memorial or the Albert Hall, who will undertake to point out to us in these great works that which the Thomas Teggs of the profession are to be prevented by legislation from fraudulently appropriating to their own sordid use? True, it is not men like Mr. Street and Mr. Norman Shaw who cry out for copyright; they who can throw off gems of design as if by instinct have their artistic vanity gratified, perhaps, rather than their commercial sensibilities exasperated, when those minor enthusiasts who avow themselves as their followers happen to be successful in imitation. In the fertile fancy of a really great architectural designer there is so much of the material of design continually pulsating with an earnest desire for the outlet which it can never achieve, and in his restless judgment so little permanent satisfaction with the tentatives of his own performance, that he would rather smile at the success of an act of inordinately palpable plagiarism than begin to calculate the amount of imaginary damage done to his breeches pockets. But, in the next street, perhaps, there is to be found, in all the pomp of pretentious practice, some gentleman whose only profitable occupation has to do with the very small fry of building, who is an eager adventurer in those private and confidential competitions where the race is more to the swift than the battle to the strong; who hangs the walls of his office with futile perspectives, which he hates to look at because of the waste of hard-earned cash they recall to his recollection; and who, if he attains to such a victory over adverse fate as the accomplishment of a presentable design, — possibly by the help of an architect to the trade, — considers he has seated himself at last upon the very pinnacle of fame. This is the gentleman who wants copyright. He knows only too well what it is to copy, and if some one like himself were to copy this, his masterpiece, — especially as the period of its execution is indefinitely postponed, and still more especially as he may have to recopy it himself a great many times yet, — he would indeed be only left to cry out, with the despoiled patriarch, "Ye have taken away my penates, and what have I left?"

The Copyright Commissioners may therefore be permitted to have felt somewhat embarrassed when they "received an application from the Royal Institute of British Architects, that a representative of the Institute might bring before them a grievance under which architects considered themselves to suffer." They may also not unreasonably be allowed to have failed to see very clearly what the grievance could be when "Mr. Charles Barry, the President, attended, and after reading a copy of a petition on the subject, which had been presented to the House of Lords in the year 1869, and some other papers, contended that architects were subjected to great injustice and injury through their designs not having the protection of copyright, so as to prevent them from being used by other persons than the author for building purposes." Still more may they have been obfuscated when "he suggested that the right to reproduce a building should be reserved to the architect for twenty years." We may even sympathize at once with the conclusion they arrived at, and only hope they did not arrive at it with too much trouble, when they say, "We are satisfied that it would be impracticable to reserve this right to reproduce a building." Lastly, we may allow the commissioners to be excused for at length turning the tables upon us with a little mystification of their own when they add that, "though architectural designs have no protection as designs, they are in their opinion protected as drawings, so that they may not be copied on paper;" and we ought, perhaps, to think the play very well played out when the further opinion is expressed "that such protection should be preserved."

No doubt, some thoughtful commissioner had asked the representative, in that off-hand, practical way which is characteristic of commissioners, whether he himself had ever suffered by plagiarism, or whether any other architect to his certain knowledge had ever done so; whether he himself had ever been tempted to steal the designs of another, or whether, in his experience, such theft had in fact any form or substance whatever except as the baseless fabric of a vision, — at the best the dream of some honest but sanguine dog in the manger, who hopes that the time may come when, in his own humble person, Nature may at length have produced a great original architect. — *The Architect.*

CORRESPONDENCE.

THE INTERIOR COLOR-DECORATIONS OF ITALY. — THE FACILITY AND SKILL OF COMMON HOUSE PAINTERS. — AMERICAN SCULPTORS APPROPRIATING NATIVE SKILL.

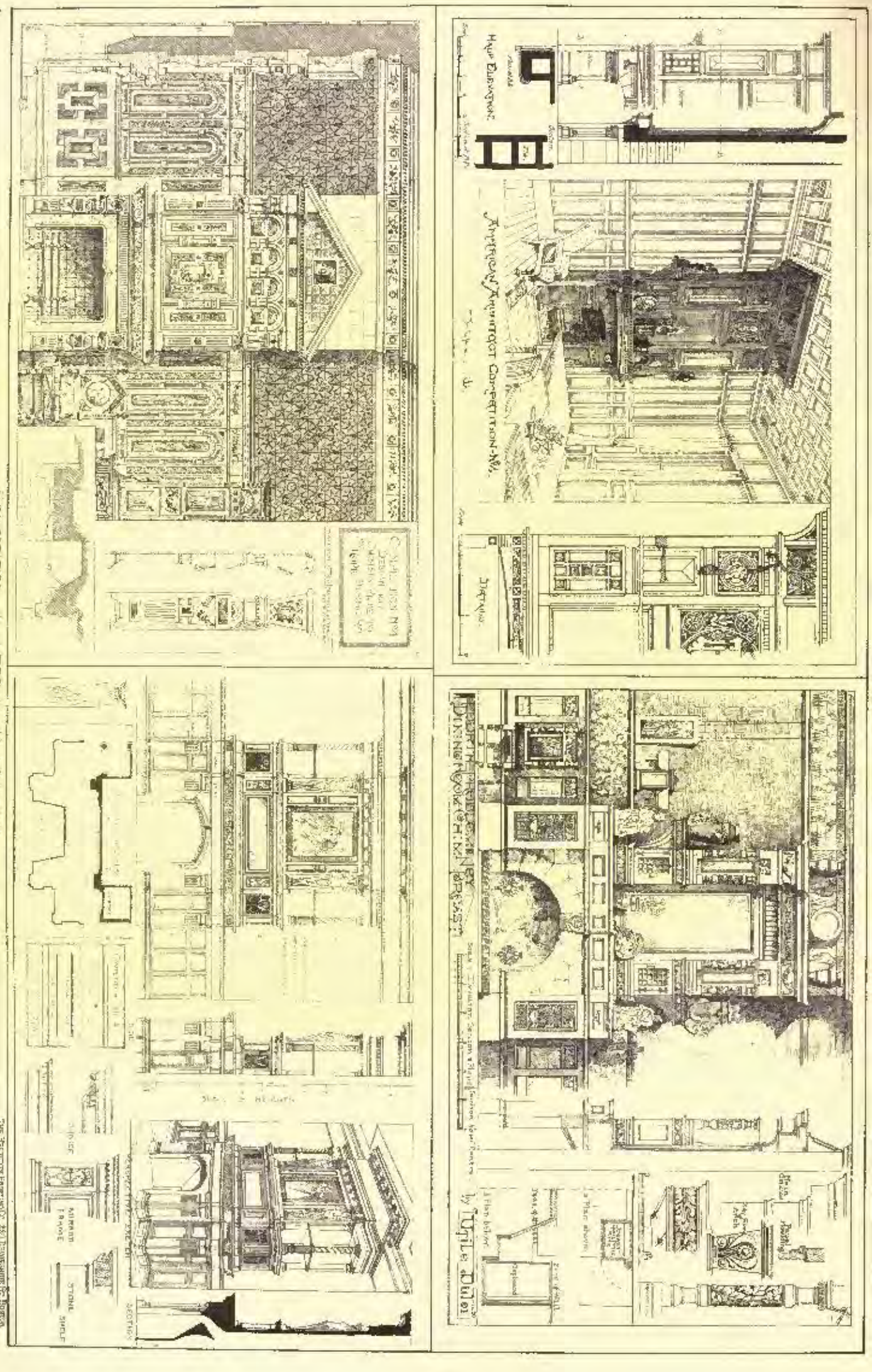
Rome.

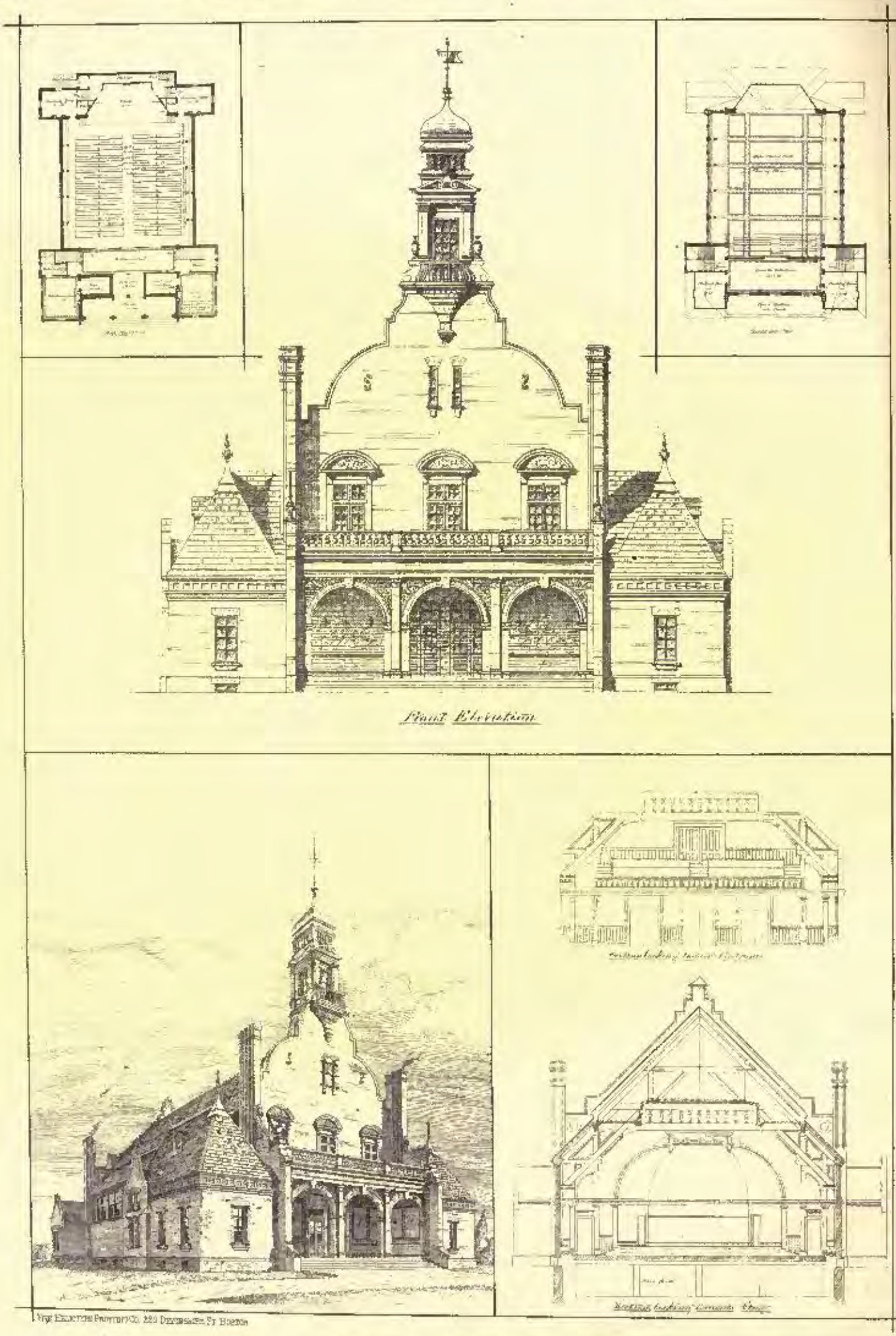
The first approach to Italy cannot fail to fill the architect with delightful anticipations; but coming from the mediæval cities of France and Germany, where varied façades of quaint design and delicate sculpture appeal constantly to the sketch-book, these anticipations are likely to be disappointed at first. He no longer is wandering by the side of a wayward stream full of artistic individuality and ingenious caprice, such as is the Renaissance of the North, but he finds himself rather on the shore of a great sea whose tide, swayed by its own prescribed laws, drowns individuality and sweeps unchanged through cities and provinces. Here and there a Michael Angelo or a Bramante rises to the surface, but they seem rather to interpret than to control this academic inundation, and the monotony is hardly ruffled. After the steep gables and broken outlines of the North, there is, too, a more absolute monotony than that of uniformity of proportion and design, for the eye, wearied by the glare of a southern sun, does not seek variety in silhouette and decoration, but finds relief in plain surfaces and broad shadows.

At first even the finest palaces appear square and bare, while — as the guilds never give to the private citizen the same wealth and power in Italy as to the enterprising burgher of the North — the ordinary dwelling-houses are without character, lines of plain stuccoed walls pierced by the plainest of doors and windows. Art has no place here away from the monumental buildings. These, thanks to Vignola and his successors, are recognized as old friends, but their familiar cornices and capitals cannot excite much enthusiasm or tempt the pencil, which is likely to remain idle till one realizes that its chief use, and a modern architect's best profit, will be found in the magnificent interiors of Italy, less known because less easily represented in books than the façades. These very books, too, have been preparing some illusions for us, especially in Rome, inasmuch as we do not suspect, on turning over Letarouilly and other books, that the stately palaces with rich cornices and friezes are of stucco! Even photographs hardly betray the beautiful columns in the court of the Palazzo Vecchio at Florence, and yet those celebrated columns, covered with exquisite arabesques and figures, are of stucco. The discovery is disagreeable, for in view of its cheap and provisional character with us it requires no small effort to look on stucco with respect, much less with admiration; yet we are undoubtedly wrong, for both Greeks and Romans, whom we cannot reproach with building flimsily, used it in their finest buildings. Perhaps had our ignorance been less and never allowed us to mistake it for fine stone we might never have regarded it as a sham, but have seen in it, as the ancients did, a natural and valuable medium for tinting or painting.

As classic architecture is inseparable from sculpture, so the Italians added to it another ally in painting, and the distinctive character of the Renaissance is the prominence given to interior color-decoration. In the subordination of every other interest to the study of this, an architect will derive most advantage here. The world has learned by rote but too well the Italian orders; it has much yet to gain from the noble interiors due to the unrivalled painters of Italy. Artist and amateur return with countless photographs and drawings of figures and sculpture, but beyond a few shadowy interiors of churches and their own vague reminiscences of a multitude of magnificent ceilings and frescoes, little is added elsewhere to our modern resources from the inexhaustible examples here of great masters, which begin from the grand mosaics of the fifth century, come to a perfect development in the fifteenth, and continue to the brilliant *chic* of Tiepolo a century ago. Further improvements in polychromatic printing will some day open up this field, but at present one's own slow studies and notes are almost the only way of carrying off any accurate ideas of these things, especially of the grand panelled and frescoed ceilings, which, perhaps above all, will some day interest us in adorning our public buildings, as yet more façades, but which further art development will sometime seek to render monumental within as without.

On all sides one sees a movement for reviving mural decoration, and with it comes the feeling that as an art it is at present lost. England and Germany are striving earnestly to create or revive a school, and the severe criticisms on the new Paris *Opéra* roused even the complaisant French to the conviction that their own noble school and its tradition had disappeared, a loss which will be the more marked as the restoration of the Hôtel de Ville calls for painters to replace those paintings which were regarded as the highest expression of French secular decoration. Among us, too, recent efforts have awakened interest in the same subject, and have called to it the attention not only of our architects, to whom this is no new interest,


Half Elevation
American Architect Competition No.
Plan
Competition No. 4 Interior Decoration
Designs for a Stone Fire Place
Mirror Frame
Stone Shelf
Section
Upper Dulci

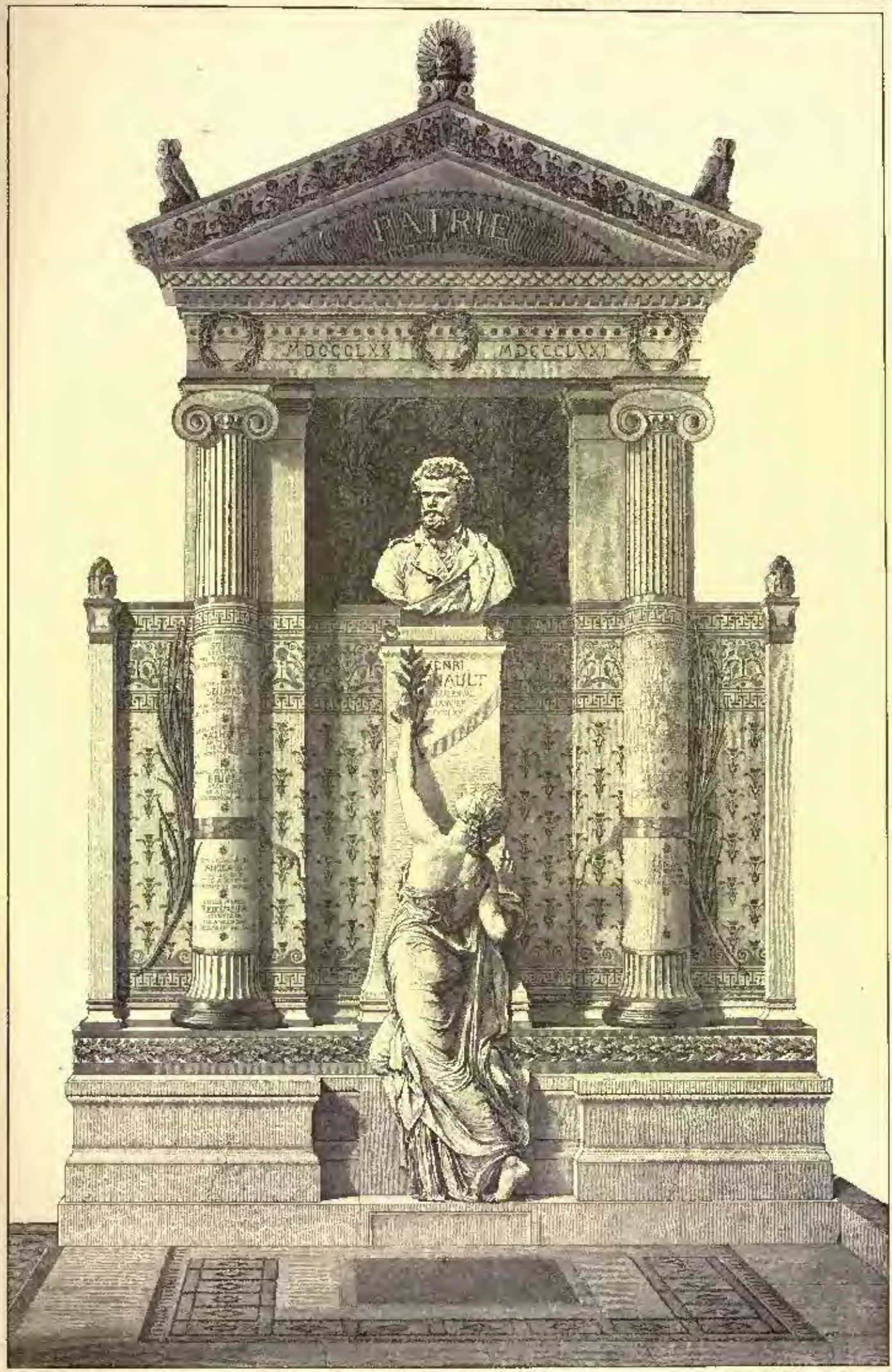


Front Elevation

Study for Milton Town Hall

Dare & Van Brunt Archts.

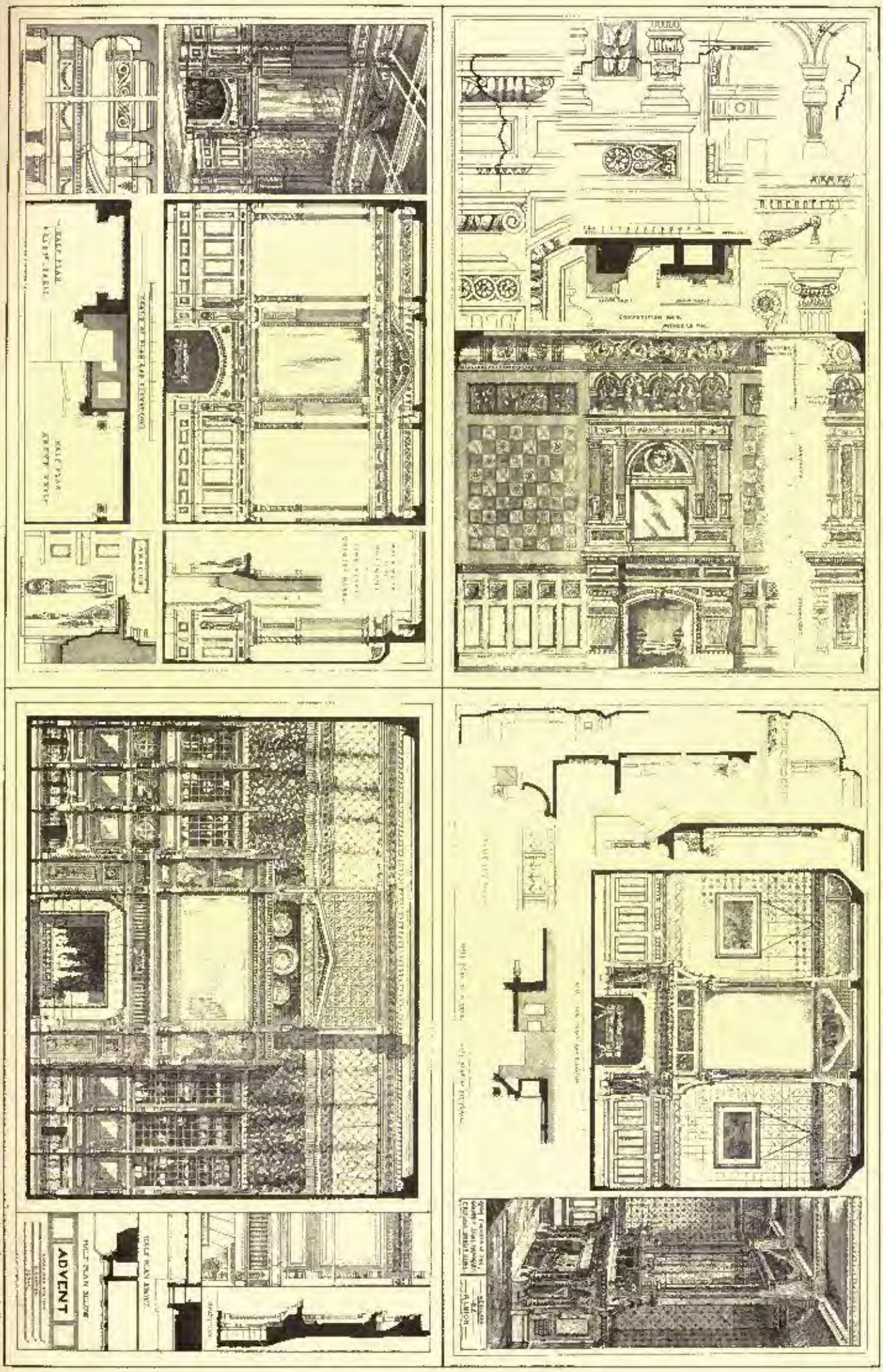
Boston.



— MONUMENT TO M. HENRI REGNAULT. —

COMPETITION IN INTERIOR DECORATION

IV. DESIGNS FOR A STONE FIRE PLACE



but also of our painters. To the latter no branch of painting offers so wide and promising a field of distinction as that of mural decoration. If they examine themselves they will probably find that they are at present woefully deficient in their technical ability to carry out an architect's or their own scheme for the decoration of a monument. Not to speak of the special studies in drawing and anatomy required for figures seen from below, which come within their own regular sphere, how many of them are thoroughly at home in perspective as applied to architectural accessories in ceiling painting? Refuge would at first of course be taken in providential clouds to hide everything except the easy parts of foreshortening, but one would soon be forced to protest against this innocent monotony as much as did the honest miner to the received idea that heaven "was sitting on the butt-end of a cloud, picking on a harp."

So thoroughly were all these perspective effects understood by the Italian painters, that even the most mediocre never seem in the least embarrassed by them, but play with the most difficult foreshortening with a facility which would seem almost genius nowadays. These traditions have been preserved through the decadence of Italian art, and the commonest house painters there inherit an astonishing facility in drawing, as well as a native instinct for color. They will dash off readily a ceiling with flying cherubs, and in a central compartment a view looking up through balustrades surrounded by figures or vases with flowers, etc., or will paint a most deceptive frieze and cornice with admirable shades and shadows.

While the highest artistic intelligence seems wanting among them, there is a wonderfully developed instinct for decorative effects, which though below what might be done by the best men elsewhere is far above mediocrity in other countries. The walls in the simplest rooms of the hotels are prettily painted in distemper with borders or patterns, while the dining-rooms have more pretentious but usually admirable designs. I mention the hotels, as they are generally new and are indicative of contemporary skill. In a new hotel at Naples the dining-room, with vaulting and pillars, is decorated with flowers and vines, following no fixed scheme, but grouped or trailing here and there on the white ground of the pillars and ceiling with the simplicity and taste of the highest art. The color is charming, and the whole would have made a reputation for the painter in the North; but I found he was only an ordinary house painter, unknown and ill paid. Their instinct and their traditions are akin to the skill which we to this day admire at Pompeii; for it is now thought that these graceful figures and exquisite designs are not the work of eminent artists, but that of bands of ordinary house decorators, whose pattern books furnished them a variety of designs, which they dashed off with marvellous facility, and in this case with unusual rapidity, as at the time of its final destruction Pompeii was being hastily rebuilt after a partial overthrow by earthquake a few years before.

These painters are poor and poorly paid, and it would be an immense advantage to our country if, instead of organ-grinders, Italy would supply us with more of these clever-fingered grinders of color, who would find ready work, and give us that facility we so much need.

In another department of art, Americans have already turned to account this Italian skill, not perhaps in a way as creditable to their candor as to their shrewdness. Amid much foolish scandal prompted by local jealousy there was some truth in the recent report that some of our sculptors in Rome had supplemented their own want of technical skill by an unfair amount of aid from obscure but clever natives, whose want of general intelligence or enterprise did not give them the opportunities of our countrymen. The latter took all the credit they could get for what came out of their studios. Their employés were content with the pecuniary remuneration, and only the jealousy of rival sculptors stirred up the trouble. Of course there are various degrees of assistance, but since it is admitted that a sculptor, after finishing his model, need not himself touch the statue, it is futile to inquire how much superior the finished statue is to the model, or why it is so.

Architects have, however, no limitations in turning to account the ability of their assistants, and we must gather to us all the technical skill we can, so as to meet the older countries with those of their advantages we can get. We should find in these decorators one pernicious fault, which it may fairly be allowed we should oppose, that is, their passion for substituting imitation for the real. Their very cleverness, as in most decadence, has betrayed them. To a protest against some most deceptive imitation of brickwork, the painter of it naively replied that anybody could lay real brickwork, but only an artist like himself could pertinently imitate it on plaster! R.

AN INTERNATIONAL EXHIBITION.—*L'Eco del Progresso*, the organ of the international exhibition to be held at Milan next year, states that the proposed exhibition is to be the third in size of any that have taken place heretofore, still the space open to exhibitors will be one fourth larger than at Paris. The main building is to be 812 feet square and five stories high. There will be twenty galleries in it, 812 feet long. The art galleries are eight in number, and will be ample for the exhibit of the vast number of art treasures that will be sent by artists and owners of collections. The buildings are to be massive, in the Lombard style of architecture, and will be permanent. Exhibitors can ship their goods from the Paris Exposition, in bond, by the Alta Italia Railroad to the building. The opening will be April 1, 1879. The Director General of the Exhibition is Mr. Frederick Guscetti, an American of Italian descent.

WHITHER ARE WE TENDING?

GALVESTON, TEX.

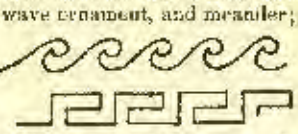
TO THE EDITOR OF THE AMERICAN ARCHITECT.

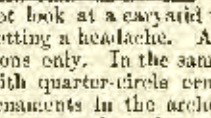
Dear Sir,—Having been a constant reader of the *American Architect* from its beginning, and feeling that it marks a new era in the architectural publications of this country, inasmuch as it represents the foremost element among our architects, I have noted a tendency in the wrong direction, especially in what is decorative, in so many of the compositions, that I cannot let it pass without asking the question heading these lines: Whither are we tending? in the hope that it may induce some of our leading talent to take a retrospect over the history of architecture and especially of decoration. Decoration, although secondary to architecture, is yet very important in a composition. Michael Angelo said, "Trifles make perfection, but perfection is no trifle." The tendency of our day seems to be, like that in the early period of Gothic, towards the naturalistic and where we conventionalize the grotesque or whimsical. The old maxim, "Nature is the archetype of all art," will hold good for all time; but another maxim of equal value and age, "Art should beautify nature," has about gone out of print nowadays; sometimes for want of capacity to fill the bill, at other times it seems out of pure ill-will; and again at others, for want of skill coupled with an inordinate ambition to make something new. This latter phase is the most mischievous. We forget that the correct, the pure, the true, are eternal and will always command respect. My old master, when I was a boy, once told me, "A good copy of a good thing is always worth something; a poor original is never worth anything, no matter how much it is elaborated."

Now it seems to me that history has established certain principles that underlie all art, as definitely as the diameter of the ordered column, and these cannot be violated with impunity. Taking, for example, the designs in interior decoration in the *American Architect* for June 1st, which represent the tendency of our time about as well as anything at hand, I will use them for reference and give the impression they make on me.

The first of these principles before mentioned is peace,—"the eye must have rest." It is impossible for any one to enjoy a decoration, unless he is at rest; and not only must the spectator be at rest, but the decoration also: the man or woman who would enjoy an artistic decoration around him would scarcely appreciate a dog-fight; and here comes in one of the most important propositions that art has to solve among men: (1.) It should ennoble the human mind, and in order to be able to do it, "it must be noble in itself." (2.) It should help to clear the mind of the inclination for what is ignoble, vicious, and barbarous (and there is a good deal almost everywhere). In this respect Art goes hand in hand with Religion; therefore pardon me if I give a new application to the trite saying, "Let us have peace." In the wall-decorations in No. 127 there is all fight and no peace; everything is challenging attention with the utmost possible importunity. One goes from a room of this kind with a feeling of relief, as on leaving a charity fair where young ladies sell things.

The second of these principles is the division of the subject into main and subordinate parts,—"building a pyramid." This principle has been acknowledged from the Egyptian time down to ours in all important compositions, both in architecture and in decoration, the whole world over; and yet some of our compositions of the present seem rather to aim at making things promiscuous than otherwise;—our example has it all over. The wall-decorations of Pompeii and Herculaneum recognize this principle in every line. In the Alhambra the main lines are the architectural lines, and the decorations are equally subordinate, giving an extraordinary richness of tone in color, produced by the juxtaposition of various primary colors and gold in the designs; of the decorations, the lines and forms being almost lost, only their tendency is clearly discernible. In the division of a subject, a wall for instance, there should be a main central point, to which all other lines and objects lean and are secondary. Now this taking a square and filling half of it with a quarter-circle ornament, all inclining one way in a room, is not allied to anything in nature, as far as I know; and in architecture there are but two forms of this kind: the Greek wave ornament, and meander; yet these run in the Greek examples either from or to a centre. The squares before mentioned run straight along; and in the wall-decoration by "Minns," where it is hitched on to one side of a sun-flower, it produces a still more unsatisfactory result





(a feeling of lopsidedness), that may be very odd but is never pretty. All unnatural things should be avoided. I know a lady who cannot look at a carpet with uplifted arms, for ten minutes, without getting a headache. All decorations should produce agreeable emotions only. In the same category with the beforementioned squares with quarter-circle ornaments in one corner, would go the scroll ornaments in the arches of the design of "Incomu." Here we have a number of scrolls, following each other, ignoring the principle that "every line in ornament must have its contra line." Wherever one line forms a certain sweep the following one must go in another direction,

or a thousand other forms. The Renaissance has given us a new

line of beauty in place of the antique. This combination of two curves with a straight line, in place of the convex and concave circles without it, as the ancients had it, has given us many of the most beautiful forms of modern times. Where it is applied with judgment, it is astonishing how much vigor it adds to the design. Above the wainscot in this design, between the windows, there is a picture introduced; why it is so narrow up and down I don't know (unless for oddity); it represents a grand dining-party at table in a dining-room seven or eight feet high, the walls of which, if it has any, are hung with tapestries. Now would not a wall-decoration treated in the same manner, with damask panels, quiet but effective in treatment, have been much better than the one introduced, which in form has very much the character of what a school-girl would do, in distinction from the master, learned in what is known and has been done in this line before he was born? "But," it may be said, "your idea is old." To this I reply, So long as you don't give us something equally as good or better than the old, I would rather forego the pleasure of having something original. In general the original and new must ever stand abreast with the old before it can command recognition; the wall pattern of the middle design in No. 127 represents vines creeping over a very primitive, simple, and cheap lattice-work, and looks very much as though somebody had made it himself. If a good artist makes it it may become very expressive, but will always look cheap. *Per contra*, see Her Majesty's Summer-house, Buckingham Palace, published by Gruner; and as a *motif* for ceilings — Greek temples, and Schinkel's theatre decorations.

In the design of "Minus" the frieze and picture are very good and appropriate, because here the architectural lines around them give the necessary system and severity; but the little square panes of glass above the windows remind one very much of the early English stained glass figures and Romanesque sculptures of, say, from the eleventh to the fourteenth centuries, which are grand for their time and people, but would be decidedly feeble and weak for our time and people. The big sunflowers of the dado and wall-pattern are Tatherting Talbert to death. Now I have criticised these compositions especially, in order to make myself understood, in the hope of inducing some of the leading architects and decorators of our time to reconsider the path they have taken, and where this kind of thing will be giving up at, that at some future time our age may not be looked upon as a time when art got crazy.

The national character of a people is expressed in its dress and its ornaments in the same manner that handwriting carries with it the character of the writer. For example, take the English, the French, and the German. In England the leaders of fashion, etc., are from twenty to thirty years old; in France, old and young alike interest themselves; in Germany, the old professor gives the tone in art matters. Now take a coat of each and note the characteristics of the people in the cut of it: the English, square and angular; the French, graceful and soft in its lines; and the German has some

of the former, and adds some scholasticism inclining to the pedantic. Take, again, the treatment of a simple trefoil by the different peoples; and we find the first is all vigor, nearly everything in straight lines; the second is all grace and elegance; the last, with some vigor (sharp corners), and some grace in the motion, has the scholasticism in the central divisions, which must all have the convex and concave sweep. Now it seems to me a big sunflower hewn out with a broad-axe does not express the national character of this great people; and yet there is so much of this crudeness in the ornamentation of our day, that I cannot think of anything else that would fill the bill; and I feel that our leading men should be able to give us something original, appropriate for our time (we are no longer in the dark ages), that would be characteristic of us, and that would not disgrace us when the future antiquarian shall find the sites where we dwelt and worked.

JOHN MOSER.

NOTES AND CLIPPINGS.

The Giant's Grave at Malaga. — After dinner, our host took us out to see his vineyard, and the great curiosity which it contained, — for behind the house was a veritable Giant's Grave! It lay on the slope of the hill, its head toward the north, its feet pointing southward, — in length eighteen English feet, and in breadth six. It was lined with smooth-hewn blocks of stone, and some few years before our visit had been opened by our present host, when a skull alone three times the ordinary human size was found, with other bones of proportionate magnitude. Of ornaments only one ear-ring was discovered, large enough almost to serve for a lady's bracelet. No conjecture could be made as to the era or race to which the giant belonged. Malaga dates back three thousand years, and is an accredited colony of the Phœnicians; and it was strange to ponder that on this lonely hill, now stirred only by the vine-dresser's step, multitudes of an unknown race and tongue might have met to do homage to their fallen chief, and that their restless eyes had perhaps rolled over the same magnificent features of land and sea. — *Correspondence N. Y. Post.*

Ventilating Chimney Cowls. — A sub-committee, consisting of three eminent sanitarians, Capt. Douglas Galton, Mr. Rogers Field, and Mr. William Eassie, appointed by the Sanitary Institute of Great Britain to test chimney cowls and similar ventilating devices, have made a report as follows: "The sub-committee appointed at Leamington to test the ventilating exhaust cowls beg to report that they have given the matter their most careful attention and carried out at the Royal Observatory, Kew, an elaborate series of about one hundred experiments on seven different days, at different times of the day, and under different conditions of wind and temperature. After comparing the cowls very carefully with each other, and all of them with a plain open pipe, as the simplest, and, in fact, only available standard, the sub-committee find that none of the exhaust cowls cause a more rapid current of air than prevails in an open pipe under similar conditions, but without any cowl fitted on it. The only use of the cowls, therefore, appears to be to exclude rain from the ventilating pipes, and as this can be done equally, if not more efficiently, in other and simpler ways, without diminishing the rapidity of the current in the open pipe, the sub-committee are unable to recommend the grant of the medal of the Sanitary Institute of Great Britain to any of the exhaust cowls submitted to them for trial. Signed by W. Eassie, Rogers Field, and Douglas Galton."

Paxton's Elevated Railway. — In the year 1856, when London was much exercised on the question of rapid transit, Sir Joseph Paxton, who is well known from his connection with the first Crystal Palace, conceived and perfected the details of a scheme which may fairly be considered the precursor of the New York elevated railroads. He proposed to build a railroad which should be contained within a glass and iron gallery some eleven or twelve miles in length. This gallery was to be about 180 feet high and 72 feet wide, so as to allow four tracks to be laid. The rails were to be laid at an elevation of 26 feet from the ground, so as not to interfere with traffic in the streets below. On either side of the gallery were to be shops and dwellings, with stations at convenient intervals. An ordinary roadway was to serve for the tenants of the houses and the shopping public. Below the railway were to be, on either side of the street, the ordinary houses and shops; but as the vibration and noise of passing trains were expected to be more annoying to those below than to those above, these buildings were to be built with double walls, and a current of air was to be made to pass through the space so left. Three times was this extended crystal palace to cross the Thames by bridges built for its service, the rental of the houses on them being estimated at $7,000 each per annum. The road was to begin at the Royal Exchange, to cross the river soon after at Queenhithe, and after passing through a portion of Lambeth, to recross the river at Hungerford and stop at Regent's Circus; the main line, however, was to pass through Belgravia, Brompton, Kensington Gardens, Notting Hill, to the Great Western Station at Paddington. On the north side it would pass over the London and Northwestern and the Great Northern railways, then back through Islington to the Royal Exchange. The estimated cost of this brittle enterprise was placed at about $170,000,000, and as such an outlay could not be countenanced, in its stead the underground railways were built. The cars, it should be added, were to be propelled by pneumatic pressure.

Demolition of a Factory Chimney with Dynamite. — An account is given in the *Deutsche Bauzeitung* of the demolition of a workshop chimney at Berlin by means of dynamite. This chimney was 170 feet high and contained about 10,000 cubic feet of masonry, weighing 864 tons. It had a division in the centre. It was necessary to make it fall toward the east, and the charge was required to be as small as possible that the materials might not be much damaged. Eight blasting holes were made from the exterior near the base, on two opposite sides, and their charges were placed as near the middle of the thickness as possible. The two chambers nearest the clearing hole on the east side were each charged with 6.15 lbs. of gun-cotton; those next the clearing hole on the west side received only 1 lb. of dynamite; the four other chambers were charged with 2.2 lbs. of dynamite. The tamping was effected by bricks and mortar. The total charge of 33 lbs. was exploded by electricity, all the parts simultaneously. The dull explosion shook the ground only to 950 feet distance; the chimney did not fall, but took an evident inclination, while three great cracks rose to 60 feet in height, and the lower part of the wall was laid open. Other holes were now made in the part of the wall remaining vertical, and a charge of 1 lb. of gun-cotton was inserted and exploded; the chimney then fell slightly toward the east.

The Sutro Tunnel. — The Virginia City (Nev.) *Chronicle* gives the following brief history of the Sutro Tunnel, which was connected with the mines of the Comstock lode on Monday, July 8th: —

"Ground was broken for the Sutro Tunnel on the 19th of October, 1869. The work has, therefore, required eight years, eight months, and ten days to complete. The progress was very slow at first, all drilling having been by hand; but, in the spring of 1874, experiments with a Burleigh drill having demonstrated the advantages to be derived from the use of that machine, a carriage capable of supporting six of these drills while at work was made, and on the 22d of June, 1874, four were started. The progress was now much more rapid than ever before in the history of tunnelling, and on August 7th in the same year, two more drills were put to work. From that date the average progress was over three hundred feet per month up to April, 1877; when, the header having entered the broad Comstock mineral belt, the heat became so intense that two drills had to be taken off the carriage. From that day the average monthly progress did not exceed two hundred and fifty feet. Work has been continued uninterruptedly from the time that ground was broken until to-day, but at times only two men were at work in the tunnel. The greatest progress was in December, 1875, when the header was advanced 417 feet, and the least in October, 1870, when it was advanced only 19 feet. The total length of the tunnel, as stated in the official chart published last September, is 20,170 feet. The tunnel being connected with the Comstock workings, the next move of Mr. Sutro will doubtless be to start north and south drifts to connect with all the mines on the lode. The work has cost nearly $4,000,000."

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CONTENTS.

SUMMARY: —
The True Responsibility for Building Disasters. — A Chance to Fix the Responsibility in the Rockford Court-House Case. — Engineers' Criticism on the Fall of the Forty-Second Street Tunnel. — Shall the Washington Obelisk be Finished? — Another costly Monumental Failure. — Accident to a Water Main in New York. — A Project to Heat New York by Steam. — Possible Effects of the Undertaking. 25
THOROUGHFARES IN GREAT CITIES 27
LIGHTNING-RODS 28
THE ILLUSTRATIONS: —
The Palace of the Trocadéro, Paris. — House at Manchester, Mass. — Design for the Moore Memorial. — Design for a Monument. — Designs for a Stone Fire-Place. 30
MONREALE 30
CORRESPONDENCE: —
Letter from Paris, — Letter from New York 32
FIRES IN THEATRES 33
THE SUBTERRANEAN WORKS AT WELBECK 34
COMMUNICATION: —
German Houses in Cincinnati 34
THE RAILROADS OF PERU 35
A DANGEROUS LIGHTNING-ROD 35
NOTES AND CLIPPINGS 35

IT is a great misfortune to the cause of sound building that neither from coroner's juries, county commissioners, nor from other special officials whatsoever, can we obtain a fair apportionment of responsibilities even in such flagrant cases as the fall of the Rockford Court-House dome and the collapse of the tunnel on Forty-Second Street, New York. If honest and thorough investigation and just punishment, instead of partial inquiry and mild censure, ill-bestowed, promptly ensued upon such cases, the admonition would inevitably be felt "where it would do the most good." Architects, engineers, and builders, would be far less apt to go on laying foundations, building piers, and turning arches according to the lazy rule-of-thumb process which must prevail where there is small danger of criminal procedure in case of disaster, and an even chance that the blame will be placed upon the immediate instead of the ultimate cause, upon the careless subordinate instead of the blundering principal. We rarely hear of accidents in France such as these pages are so frequently forced to chronicle out of our own experience, because there the law watches over the public interests and punishes a fault of construction or carelessness as it punishes highway-robbery or any other crime against society. We learn, for instance, that the French courts, which have been investigating the case of the fall of the passenger elevator at the Grand Hôtel in Paris, not being able to fix the responsibility upon the manufacturer, have fined and imprisoned the engineer in charge for careless oversight of the condition of his hoisting gear, and announced that the proprietors of the hotel are liable to criminal process for damages. The case seems a hard one for the engineer and for the hotel-keepers; but we picture with what renewed care all the engineers in charge throughout Paris will look after their apparatus, and with what fresh solicitude every proprietor will inspect his elevators. Thus, out of the nettle danger, if properly cultivated, will grow the flower safety.

WE have frequently had occasion to refer to the unsatisfactory condition in which the Rockford Court-House affair has been left by the investigations. The responsibilities of the architect have not been defined; the contractor, Richardson, who, according to the testimony, tampered with the plans, and put in poor workmanship and worse materials, has not only been continued in charge, but has been allowed a large sum with which to repair damages, and the Building Committee has escaped all censure. Now, however, we learn that the affair is about to go into court, where we may hope for a complete and exhaustive examination and a proper distribution of blame. Two suits, in the amounts of $5,000 each, have been entered by the widow of one of the victims of the disaster, one against Richardson, who is held to be immediately responsible, and one against the Building Committee, whose members, it is claimed, must, under the law, stand judgment as individuals and not as officials backed by the county. If either of these suits results favorably to the plaintiff, there will be a number of others to follows. It appears as if at last we shall now get at the "true inwardness" of this unfortunate affair, and that architect, contractor, and committee will find themselves set right before the public.

As for the New York tunnel, in default of open and complete expert testimony before the coroner's jury, the local press has availed itself in several instances of the services of well-known engineers, who give their opinions at great length and with much circumstance of figures and calculation. Their conclusions are virtually identical, and may be epitomized as follows: that the arch was "an ellipse within an ellipse," and as such had a rise of only ten feet in the width of forty feet; whereas it should have been "a true ellipse," which would have had a rise of twelve and a half feet; that the arch, even if built exactly according to Commissioner Campbell's specifications, could not possibly stand; that the arch had no centering whatever; that the abutments were not properly built; that the cement was radically bad, and the stones used improperly cut; that the commissioner's specification was vague and undefined, and its application could not possibly give stability to a brick arch so flat and disproportioned. The conclusion is, that for similar work a railroad company would hold its chief engineer responsible. When our municipalities conduct their affairs on a business basis like the corporation of a mill or of a railroad, we shall no longer see this baleful process of political whitewashing to cover the criminal defects in the public service.

WORKMEN are now engaged in removing from the base of the Washington Monument the accumulations and *débris* of a quarter of a century, preliminary to the resumption of work upon that long-neglected and dreary pile of masonry. We fear, notwithstanding the precautionary proviso in the joint resolution of Congress (*American Architect*, vol. iii., p. 170), that we are destined to see the completion of it in accordance with the modified plan; the discordant and barbarous conception of the Pantheon at its base having been replaced by Mr. Mead's terraced and balustraded esplanade, and the proposed height of six hundred feet for the central obelisk having been reduced to four hundred and eighty-five, at which elevation it still will overtop by five feet the highest structure now existing. But as the spire of Cologne Cathedral will, when completed, rise some twenty-six feet above our republican monument, and there is no knowing what superior aerial heights the effete monarchies of Europe may think it worth their while to attain with steeple or dome, fifty or a hundred feet will be added doubtless, if the money holds out, to the great republican obelisk, in order that it may still stand preëminent in this respect, if in no other. Fortunately, the structure is not and cannot be so nicely studied that such an addition would interfere with its essential proportions. A brute mass is not sensitive in this respect, like a work of art, and we sincerely trust that our monument may never be suffered to lose the only claim it can possibly have to the consideration of mankind; unless indeed some such claim can be found in the fact that never since the dawn of civilization has a public monument been erected in which has been combined so small a proportion of human thought with so large a proportion of human labor. The result of plainness, squareness, simplicity, and extreme height will doubtless assert itself to the common mind as a clear achievement (in the vernacular, *a big thing*), disturbing the spectator, however, with no necessity of analyzing details, requiring no intellectual effort to understand, creating no tumult of emotions, and inspiring no thought worth the thinking. If its sides were engraved or sculptured, like the Egyptian monoliths, its prototypes, or like the Column of Trajan, with legends and bas-reliefs, so that they could be read and studied and understood, if it were treated not like a monolith, but like a form built up of small parts into a great structural harmony, as the spire of Strasbourg, for instance, — which, by the bye, is only ten feet lower than our aspiration, but is crowded with evidence of human thought, skill, and love, — it would be a work of art, a true monument, a *denkmal* or think-token as the Germans call it. It is the highest function of art to inspire thought in this manner, and it is quite possible to conceive of such a

monument which should yet have every desirable quality of breadth and repose. The resources of the country are fully capable of an achievement, the merit of which should be, not that it is the highest structure in the world, but that it sets forth to the senses the idea of a national tribute to a great and pure life. In the presence of such an offence to civilization as this bald obelisk will prove to be, if ever erected, artists, whether painters, sculptors, or architects, will have need to ask themselves why they are encouraged to exist and ply their vocations if such a memorial can by any possibility, or in any way, accomplish the results which should be expected of it. The gentlemen of the Washington Monument Association, if they really decline to submit to public competition the form which this conspicuous testimonial should ultimately assume, and if they really prefer to retain the essential features of a design made some thirty-five years ago, when there was little or no art in the country, will doubtless save themselves an infinity of vexation, labor, and delay, but they will have irrecoverably lost a great opportunity. We again, on behalf of the high interests of art, commend this subject to their careful revision. It may not yet be too late.

Mr. James Jackson Jarves writes from Florence to the *New York Times* that it is proposed in France to form a separate ministry of the fine arts as one of the departments of government, in order to secure a greater efficiency in the administration of the artistic interests of the country than is obtained by the present system of entrusting them to a bureau in the Department of Public Instruction. This would be a characteristic recognition of the importance of the highest artistic culture to the welfare and happiness of a great people, and it is out of such recognition that proceeds the unfounded preëminence of France in all that pertains to monumental art. How far we ourselves are behindhand in such matters may be measured by considering our lamentable failures in respect to our public monuments. Thus, Mr. Larkin G. Meade, to whom we are indebted for the modified Washington Monument, which we so heartily deprecate, has completed the model for the monument to be erected at Bennington, Vt., at the joint expense of Vermont, New Hampshire, and Massachusetts, in memory of General Stark. According to the description in the papers, the statue of the hero, twelve feet high, is to be placed upon a structure one hundred feet high, "which in some respects is to be a copy of the famous tower of Giotto in Florence," and which "will be ornamented with bas-reliefs representing incidents in General Stark's campaigns." The Italian city spent the equivalent of five millions of dollars in erecting the Campanile, exhausting the resources of invention and skill in the midst of the greatest era of Florentine art. It is more than three times as high as the proposed American copy, and is filled with minute detail, on which its essential expression depends. The imagination cannot entertain the idea of a small copy of this monument, to be built at a cost of about sixty thousand dollars, and cannot conceive what sort of an inspiration can be derived from the great original to suggest a pedestal for a statue; and the imagination would certainly be the only means of ascertaining the qualities of a twelve-foot statue surmounting this strange pile. As Mr. Jarves justly remarks, the statue might as well be one hundred feet underground. If the description does justice to the design, the figure might as well be St. Simeon Stylites as poor General Stark. No good purpose of art, history, or patriotism can be subserved by such an erection. We trust it is not too late to be reconsidered. When will our great characters and achievements be honored as Henri Regnault and his compatriots are honored in the court of the Ecole des Beaux-Arts, in Paris? When will our art be worthy of our heroes?

The democratic institutions and instincts of this country could have few better illustrations than the accident that happened in New York on July 15th, where a blast, improperly fired, fractured the thirty-six inch water-main at a short distance only from the obstructing rock, and was the cause of damage to the cellars of the abutting buildings to the amount of some eight thousand dollars. It seems that one Henry McGucken, a plumber, had taken a contract to connect a house on Third Avenue with the service-pipe that runs alongside of the Croton main, which, at this point, is laid in a trench cut through a ledge of rock. Through this ledge a new cutting had to be made, and it was in making this cut that the unfortunate blast, either too heavily charged or improperly covered, was fired. We question whether in any other country it is allowable, as it seems to be in this, for a person, be he licensed plumber or not, to tear up the causeway and act his pleasure on such corporate or private property as he may find below the surface. Fortunately, as no death was caused by the accident, we shall not be forced to content ourselves with the dictum of a coroner's jury; but from the litigation which will doubtless ensue, we may be able to gather some enlightenment as to how far our lives and property are at the mercy of private individuals who may choose, for purposes of their own, to put them in jeopardy. One thing seems plain, that this accident, following so closely on the fall of the Forty-Second Street tunnel, will teach the officials of the Department of Public Works the importance of attending strictly to their duties, and that even the simplest operation, for whose maladministration the city may be held responsible, ought not to be left in the hands of ordinary and inexpert workmen unrestrained by competent supervision. If experience has shown the advantage of having a special set of men who alone are qualified to tap sewers, this accident seems to show the need of licensing a similar body of men, who alone shall have the right to make connections with water-pipes. As the suggestion affects both parties, we recommend it alike to city governments and to water companies.

The communist and proletariat may rejoice at any change that will avenge, even for a short time, the fancied wrong done him and his by the engineer and the machinist, who are ever on the alert to replace manual by mechanical labor, and may see in the introduction of a system of heating cities by steam, one of the first effects of which will be to throw out of employment a large number of engineers, boiler-tenders, and steam-fitters, a species of poetical justice. The experiments that have been made at Lockport, and, we believe, at Buffalo, have proved, seemingly beyond peradventure, the feasibility of heating a large number of buildings by steam supplied from a common source; though the possibility of supplying in the same way steam for manufacturing purposes seems not to be so clearly established. A number of citizens of New York have lately purchased the right to introduce into that city the Holly system of town-heating; and already more than a million dollars have been subscribed for the purpose of making preliminary experiments; these proving satisfactory it is supposed that there will be small difficulty in obtaining money to extend the system so as to embrace the whole city. The scheme so far as at present developed is, ultimately to divide the city into five sections, in each of which is to be a battery of fifty boilers, which, it is thought, will be able to meet all probable demands. These batteries are to be placed in four-story brick buildings, presumably isolated, having an area at the ground of some two hundred square feet. Starting from these centres a system of mains and connecting pipes will be laid throughout the city, and each consumer will be furnished with a meter, so that he may be called on to pay for only as much steam as he uses. Means are provided for heating the condensed water by live steam, and causing it to circulate over the house by a separate system of pipes. No statement is at present made of the first cost of the plant. But some idea of the running expenses may be conceived from the statement that the five batteries are calculated to consume about twenty-five hundred tons of coal each day. In the economical introduction of the system the shape of the island may be of use, as it is stated that a battery of the size mentioned is capable of sending steam to points two miles distant without much loss of effective power.

The possibilities of such a system are curious to picture to one's self. Experiments made last winter show that steam can be used to advantage to dissipate snow, either as it falls or after it has collected in the streets, the actual cost of melting a ton of snow having proved to be only five cents. This use of steam may, then, be looked upon as certain, and the thousands of dollars that the city is now obliged to spend in the fruitless endeavor to keep the streets passable in a heavy winter may then, with a certain justice, be diverted to the better preservation of hygienic conditions in the summer. As the system provides for the reheating and circulating of the condensed water, it will be possible to establish hydrants on the street where hot water can be drawn at all times, and the cold water pipe alongside may be kept from freezing by the accompanying steam-coil. Not only horses and cattle, but incidentally the sparrows and other winter birds, which perish in great numbers

in a hard winter, will be benefited by these unfrozen drinking-troughs. Alongside of the cold-water hydrant may be placed a steam chest to which the fire-engines may be attached, thus making possible such remodelling of the present fire-engine that the boiler, fire-box, etc., can be dispensed with, enabling the engine to reach a fire more speedily than now. It may be possible to so apply steam to street cars as to do away in one case with horses, and in the other with the noisy locomotive overhead. It cannot fail to make the use of elevators in stores, dwellings, and, we hope, in schools, more common than at present; and the same may be said of the introduction of ventilating fans into hospitals, schools, public halls, and factories. Many of the lesser industries now carried on by manual labor will owe their development to this cheapness of the steam supply. In opposition to the scheme may be urged the increased uncheerfulness of homes steam-heated, and the spread of those ailments common to the people who inhabit them; but the saving in expense, allowing a more general use of open fires, would prevent the first, and greater attention to ventilation would obviate the second of these defects. To the charge that the explosion of one of these batteries would cause immense damage and loss of life, it may be answered that the explosions that now take place continually at unexpected places and under irresponsible charge probably cause as much damage in the course of one year as the explosion of a carefully watched and competently managed battery in an isolated building could possibly inflict in a very much longer period. The batteries could easily be arranged in relays so that accidents need not affect the working of a whole battery and so bring to a stand-still the operations of one fifth of the city.

THOROUGHFARES IN GREAT CITIES.

THE crowding of the thoroughfares of great cities is becoming a serious evil, the daily traffic having grown until it actually outstrips the capacities of their streets. There are cities, like Paris, Berlin, or Vienna, in which the circulation is so far diffused as not to be greatly embarrassed, and is tempted into particular streets mainly by their greater capacity and magnificence. But there are others, such as London, or New York, in which natural conditions concentrate such a flow into one or two channels that no existing thoroughfare would comfortably hold it. The first resort, when a street becomes intolerably crowded, is to widen it, and this, except in a few instances, is the only thing that has been tried. But there are limits to the convenient width of streets, limits which have sometimes been overstepped. If Broadway or the Strand were made wide enough for the convenience of all the passing in them, and all that their added width would tempt into them, the width would bring serious inconveniences. Too wide streets are made disagreeable by the wind in cold weather, and by the sun in hot. They are expensive to maintain, difficult to keep free of dirt and dust, and extremely uncomfortable for foot-passengers who have to cross them. In such a street as we have imagined, the opposite sides would be almost as hopelessly isolated from each other as the banks of a river. Even in Paris, where the mercantile traffic is not heavy, the crossing of the wide Boulevards is at certain hours of the day almost perilous, especially for women; filled with the traffic of Broadway, they would be almost impassable. As most New Yorkers will remember, a dozen years ago the difficulty of crossing the lower part of Broadway had grown so annoying that a foot-bridge was built across it. It was found, however, that the obstruction of the sidewalks by the piers of the bridge and the stairs which led to it, and the labor of ascending and descending every time it was crossed, more than balanced the relief it gave, and it was soon taken down. A notable instance of a city which has suffered from a too ambitious expansion of its thoroughfares is Washington; and one of the good things which the Board of Works did for it was to constrict some of the waste streets by parking them. We doubt whether a street for traffic so wide as Pennsylvania Avenue, for instance, can ever be a success. A fashionable drive, like the Avenue des Champs Elysées, at Paris, which is laid out for a throng of fast-moving carriages, and which foot-passengers are to cross at their peril, may be of such width; but for a business thoroughfare it is unmanageable. It would be extremely dangerous to invite the throng of vehicles which crowds Broadway to move at speed, and there is a limit to the size of the current which foot-passengers should be required to stem in crossing; but one horn or the other of this dilemma presents itself as soon as we get busy streets of immoderate width. There is, in fact, some natural antagonism between vehicles and foot-passengers, in which it is as important to defend the last as the first. Danger and inconvenience to foot-passengers increase with the number of vehicles which are allowed abreast, as well as with their speed, till they reach a point where they become intolerable. We are inclined to set eighty feet between curbstones as the maximum width of a convenient thoroughfare, and where there is no line of car rails we should say sixty. This gives room for two lines of carriages moving deliberately in each direction, and for a file to stand at each sidewalk. Footways of from sixteen to twenty feet on each side would increase the width to ninety-two or a hundred feet between the houses, with a greater proportion of footway than is common, though not more, we think, than is desirable in a first-class thoroughfare if the travel is to be all at one level. But Pennsylvania Avenue is two hundred feet between the houses. Such a street must be a failure in its architectural and picturesque aspect, for it dwarfs any building that can be put upon it, and men and vehicles, unless in the swarm of a great celebration, are lost in it like flies on a floor.

Finally, we may add that such enormous streets are as difficult to light and police as they are to pave and clean; that they consume a great deal of space that might be more profitably used, thus diminishing the ratio of taxable property to the cost of the highway at its charge, and furnishing a poor equivalent for the parks and pleasure-grounds which might be substituted for them.

It seems, then, that while the natural increase of ordinary traffic and circulation in modern cities has crowded thoroughfares much beyond convenience, the simple remedy of increasing their size is not adequate. This is the effect even of the growth of uses that are immemorial, but is greatly aggravated by the new uses which this country has found for its streets. The gas-pipes, water-pipes, and sewers with which cities are nowadays netted over were necessarily thrust under ground as soon as they appeared, but even then they do not cease to be obstructive. The interruption which is caused when they have to be altered or repaired is an annoyance which ought not to be tolerated. When to all the rest is added the periodic passage in certain streets of a vast number of people who, according to the fashion of many cities, live in suburbs and do business in the interior of the city, and so must further crowd those streets with special vehicles for through passengers, we find the thoroughfares altogether overburdened.

Mere increase of size being an insufficient remedy, the next resource is in classification and separation of the uses to which streets are put. The rough division into roadway and foot pavement is no longer sufficient for this; but through traffic and way-traffic in both kinds may be encouraged to divide, and the wayside-traffic will bear subdivision according as it is for heavy business or ordinary shopping, or the mere passing of residents. The obvious device of carrying the gas, water, and sewerage services in under-ground galleries or subways, so that they may be reached without interfering with the streets above, is a costly one, and so far as we know has not yet been adopted except in Paris; yet it is one that must ultimately, we suspect, become imperative in large cities. To divide the traffic above is more difficult. One way would be to distribute the light and the heavy traffic, the through and the wayside, in different streets, parallel if necessary. But traffic is obstinate and will not be led by the nose, even though ultimate convenience were to be promoted by it. Light and heavy business jobbing and retailing will crystallize apart when they are compelled to. But the wayside-traffic clings to the through-traffic. Shops, offices, hotels, and — when they are not absolutely driven out — residences cling tenaciously to those streets which are natural thoroughfares. It is almost impossible to absolutely separate the two currents; the resource is to carry them as smoothly as possible side by side, keeping them as distinct as may be and allowing free opportunity to pass at will from one current to the other. The exigencies of quick transit have already, in London and New York, made some separation between the two classes of city passengers. Londoners and New Yorkers have solved the problem in their different ways, withdrawing the through travel from the local, by carrying it, in London, under ground beneath the other, in New York, in the air above it. The Londoners sacrifice their passengers, and they travel uncomfortably, but the streets and the way-traffic are undisturbed. The New Yorkers have sacrificed the streets to the through

passengers, or perhaps to the economy of the transit companies, in a way that is characteristic of the readiness of Americans to sacrifice everything to an immediate object, and that if persisted in must permanently change the character of the streets it affects. The method of relief which we suggested for this exigency a short time ago (*American Architect*, June 29, 1878) deserves a few more words, for it is applicable to the relief of other streets than those in which elevated railways run. It is simply the carrying out of what is already foreshadowed, a system of circulation on different levels. The subways of Paris, receiving the conduits of the city and the traffic to which they give rise, are the first hint of such a system. The Broadway bridge was another hint at a double-level circulation. It failed simply because it was isolated and of difficult access, and because its position made it an obstruction; but as part of a well-adapted system it would have succeeded. The elevated roads are another step in the same direction, and they may lead to a new order of things.

What we suggested was the lifting of a range of footways to near the level of the second stories of buildings, so that there might be a continuous circulation at a higher level as well as on the ground. This was to be done either by cutting out a passage-way from the second stories of the buildings, to be treated as an arcade, or "row;" or else by setting back the façades above the first story and leaving an open terrace in front of them. In either case the upper footway would retreat behind the under, passing over a part of the lower stories of the houses, and be continued by bridges across the side streets, with stairs at their intersections. But in the one case it would be covered by the overhanging buildings above it, and in the other open to the air. The *Nation* lately, while mentioning our suggestion with encouragement, cited some of its natural difficulties, such as the irregularity of stories in existing houses, and the reverberation of the noise of the elevated roads in case arcaded galleries were used. These, however, are difficulties incident to particular cases. When old buildings were to be adapted, there would be some trouble, some paring and piecing of the portions of the lower stories overrun by the footway; but perhaps no greater difficulty than is common in the remodelling of old fronts; while new buildings would be adapted without trouble. Where there was an elevated railway the open terraces would doubtless be preferable, as the *Nation* suggests, to the arcaded galleries, at least unless the street were exceptionally wide. It is hoped that some way will be found of abating the noise of the railways, which is said to be at present almost intolerable.

There would be many advantages in what we may call a double-level circulation, besides those we mentioned in our former article. The tendency to stratification in modern cities is very marked, and is increasing. It distinguishes many continental cities, — Vienna, Berlin, Brussels, for instance, — and is found in its completeness in Paris, where the whole city is in layers: a layer of shops and warehouses, a layer of lesser business and domestic apartments, layers of first-class, second-class, and third-class dwellings, and layers of cheap lodgings above. The tendency is resisted by people of English descent, but begins to show itself even in England, while Americans, especially in New York, already turn to it with characteristic recognition of its convenience. It is in accordance with this tendency that people who use the same quarters of a city for different purposes should circulate at different levels, where the levels are discriminated by heavier and lighter business, as by jobbing and retail trade; by shops and offices; by business premises and dwellings; or by dwellings of different classes. If women intent on shopping, or men on professional business, could make their rounds above the level of the busiest and noisiest traffic, it would doubtless be a welcome relief; but the greatest gain might be in giving facility to rapid transit in a new way. In an American city, as soon as business invades the lower stories of a block all but the poorer residents flee space, and that quarter is lost for dwelling-places. But except in those quarters where the business tide rises to the upper floors the insulation of a single story in height might be made as effectual as that of several blocks horizontally. It is the visible juxtaposition of business and dwelling, and the living right against a busy street, that offends the Anglo-Saxon sense of domesticity. But if the two currents of business and social life were kept part, and actually out of sight of each other, as they might be at different levels, privacy and accessibility might be reconciled. The ease and safety with which — thanks to incombustible construction and the use of elevators — we are learning to carry our buildings upwards make it the more desirable to raise the level at which we can pass from one to the other, and give a chance to improve the healthfulness as well as the comfort of them by putting as large a proportion up in the light and air as practicable.

There are cities to whose natural conformation such a treatment of streets seems particularly suited. We have before called attention (*American Architect*, June 30, 1877) to the value of natural elevations in the sites of cities, and the singular perverseness with which they are neglected or deliberately sacrificed in American cities. Towns set in a natural hollow, like Cincinnati, or built on uneven ground, like Baltimore, or Boston in its old days, might be especially benefited by a plan which would allow people to pass from one high site to another without descending to a lower plane. Inhabitants might learn the excellence of the higher levels, with their natural advantages of drainage, air, and retirement. People whose eyes were wonted to a terraced construction might be spared the temptation to pare everything down to a hopeless flatness, which has already begun the ruin of many fair sites. Natural elevations might be preserved and prized for their value as resting-places, and as determining the flow of population as well as drainage.

Let us imagine a city street with a roadway of fifty or sixty or even eighty feet, flanked by lower sidewalks, say a dozen feet wide, against which rise the lower stories of a row of buildings; and upon these stories a terraced walk somewhat wider than the lower, having for its background the fronts of the buildings carried up to their full height, with a width of a hundred feet or more from house to house. Light foot-bridges would span the side streets and also the main thoroughfare at the crossings, so that the upper current at least would pass from side to side without danger or hindrance to themselves or to the traffic in carriages below. The architectural effect of such a street might be very imposing, and its convenience, we are persuaded, would solve many difficulties. The frequent bridges, as seen from below, would more or less interrupt the long perspectives, but would be a trifling impediment compared with the elevated roads, and would not hide any building except from one or two points. But the real field of view would be transferred to the upper level, where the outlook would be nearly unobstructed. There would be some impediment to those who came in their carriages to visit the upper stories of the buildings; but the natural tendency of this system of communication would be to encourage building broadly in flats around interior courts, with a great advantage to light, air, and cleanliness, which courts would give, as in Paris, the carriage entrances to all the upper apartments.

As between arcades and terraces, both would have their merits. Arcades would suit naturally with wider streets. Terraces would suit with any street that was not so excessively wide as to belittle the buildings upon it, and would by expanding upwards increase the supply of air and light. Arcades would be a shelter from hot and cold winds, and in hot weather would give the great blessing of a circulation under cover. They would also allow the abutting owners the use of their whole depth on every story except one. Either would be somewhat costly; but we are speaking of the highways of large cities, which are always costly, and either would give, architecturally and picturesquely, the means of magnificent effects.

LIGHTNING-RODS.[1]

In alluding to the plan which is now so commonly advocated, of enlisting the mains of gas service in towns to do duty as earth connections for lightning-rods, it may be necessary to say, in the way of caution, that no iron gas-pipe smaller than an inch should ever be allowed to approach to any part of a system of lightning defence, and that no gas-pipe of soft metal of any kind should be permitted to be near to the conductor. It must be well kept in mind that the very circumstance which makes the gas-main so good an earth-contact for a conductor constitutes at the same time a grave danger if this precaution is not observed. The mains of the gas service are generally so ample and excellent in the earth connections which they supply, that lightning striking a conductor with an ordinary earth-plate, or probably with some earth connection even less carefully provided than that, would be almost certain to leap across to any soft-metal gas-pipe placed near to the conductor, in order to avail itself of that better and easier path to the earth; and in doing so would melt the soft metal and set the gas alight. Fires are very frequently caused in this way. It is a radical axiom of lightning protection that the conductor must never be carried near to small, and especially to soft-metal, gas-pipes.

[1] From a paper read before the Society of Arts by Dr. R. H. Mann, F. R. A. S., and published in the *Journal of the Society of Arts*.

One of the most interesting features of the work which Professor Melsens has been carrying on in connection with his labors at Brussels is that various points of theory have been subjected to experimental investigation as the construction has been in progress. The professor was kind enough to show me some of his experiments when I was in Brussels. I may advantageously speak of two of these. He has devised an arrangement of apparatus to show that it certainly is not true that an electrical discharge goes by the nearest and easiest path to the earth. He has distributed a series of conductors, somewhat in the form of a gridiron, in which a large central stem goes from a battery direct to the earth by the nearest possible path, and in which lateral branches of much smaller diameter make longer paths on each side of the central stem. When an intensity current, or rather a stream of intensity-discharges from an induction coil, is transmitted to the ground through this system of conduction, the knuckle advanced to the small outside and roundabout threads receives a sharp shock, as well as when it is presented to the central stem. The fact is simply that the discharge traverses all the paths that are open to it, and distributes itself amongst them in proportion to the resistance which each different route affords.

Another very beautiful experiment is arranged, to show that although copper is a better conductor of electricity than iron it has less molecular strength to resist the disintegrating influence of a powerful discharge. A fine wire is carried along for several feet, of which one half is made of copper and one half of iron. The two halves are of exactly the same diameter and length. These wires are so placed as to be continuous with each other, so that the same discharge may have to pass through both. The discharge of a Leyden battery of fifteen large jars is then passed through these wires, and it is found that the copper wire is dissipated into black powder, but that the iron wire is only beaded along its entire extent, and not broken in its continuity. This affords some incidental support to the selection of iron, instead of copper, for the conductor at the Hôtel de Ville, at Brussels. But the chief reason for this preference has really been the large cost of copper in a work of this dimension, where the conductors have to be so profusely spread in all parts of the building without any concomitant advantage from its employment, since an equally good result can be insured by iron. The copper, it was conceived, would also have furnished a greater temptation to thieves in any exposed part of the structure to which light fingers could have found access.

In his "Description Détaillée des Paratonnerres," Professor Melsens insists very strongly upon a principle which I have already urged with some persistence from this place, namely, that "the chances of a lateral discharge from a lightning-rod decrease in proportion to the capacity of the conductor." I allude once again to this, because it is the fundamental condition upon which the efficiency of a lightning-rod depends. The importance of the large earth-contact and the abundant supply of points is but a part of the more general question of capacity as a whole. The tension of an electrical discharge has to be kept as low as possible as it passes through the rod, and that is accomplished in three ways: (1) by easy inlets through points; (2) by large sectional area of the rod; and (3) by spacious and free outlets to the earth.

There is one other passage in this book to which I desire also to draw something more than a mere passing attention,[1] because I glean from it that Professor Melsens holds that a "good earth" for purposes of telegraphy does not necessarily imply a "good earth" for the safe discharge of the lightning-rod, and that the indications of low resistance to a galvanic current do not certainly prove the efficient condition of a *paratonnerre*. He obviously conceives that the view which is ordinarily accepted upon this point should not in all cases be admitted without some qualification and reserve, and without precautions in carrying out processes of testing.

The method employed by practical electricians in testing the capacity of conductors for electrical currents and discharges is a very ingenious one, which depends for its efficiency upon the fact already alluded to in connection with one of Professor Melsens' experiments, that electrical currents diffuse themselves through conductors in proportion to the resistance offered in different directions. The instrument employed in the operation is some form of what is termed the "differential galvanometer." A copper wire is so arranged as to branch out into two circles, which run round a suspended magnetic needle, the one in a direction from left to right, and the other the opposite way. When a galvanic current is passed through this wire to the earth, as the two circles are of equal size and made of the same kind of wire, the current divides itself equally between them, and as one half of the current consequently goes round the needle one way, and the other half the opposite way, the needle is not deflected by either of them. It remains evenly suspended between the antagonistic impulses. If, however, a gap is made in one of the circles, and a source of increased resistance is introduced into that gap, a larger proportion of the current is immediately thrown into the other circle, and the needle does consequently deviate from its central position of rest to an extent dependent upon the excess of current that is influencing it. Known quantities of resistance, in the form of coils, can then be introduced into the other circle until the needle is brought back to its original position, and in that way these become the measures of the resistance which is required to be known. When a lightning-rod is introduced into one of the circuits of such a galvanometer, the needle will not deviate from the central line by more than one or two degrees, if the capacity and connections of the conductor are good. If, on the other hand, the conductor be faulty, the needle will diverge to a considerable degree.

From the reference which has been made to Professor Melsens' great work at Brussels, it will have been gleaned that there are two different systems of protection against lightning recognized by scientific electricians at the present day: (1) the system of multiple rods of weak sectional area,[2] which has been so skilfully carried into effect by its distinguished advocate at Brussels; and (2) the system of a single rod of large area so placed as to protect a considerable space around by its dominant height and ample dimensions.

Experience has virtually shown that either of these systems may be followed with equally satisfactory results, if intelligently and skilfully administered. M. Melsens holds that the multiple-rod plan is best adapted to structures such as he has had to deal with. A widely extended adoption and a very successful use indicate that the single-rod system is, in its turn, as well suited for its work with buildings of a more ordinary size and of a different character. But the most important practical lesson which comes out of the comparison of the two systems is, perhaps, the suggestion that the one most commonly used has some points which are capable of being materially strengthened by borrowing something from the alternative plan. This may, however, be most serviceably expressed in the form of a condensed aphoristic abstract of the fundamental conditions that, in the existing state of electrical science, may be most advantageously observed in the construction of lightning-rods.

1. The copper rope or rod employed as the main stem of a lightning conductor should in no case have a diameter of less than four tenths of an inch.

2. A rope or rod of four tenths of an inch in diameter is not large enough for the protection of buildings that are more than eighty feet high. The resistance offered by a conductor of any given diameter increases with its length. Long conductors, therefore, require to be of larger size than short ones.

3. For every additional eighty feet of height or of extent a second rope or rod, of the same transverse dimensions, must be added, or the sectional area of the single rod must be increased in a similar degree.

4. It is of no practical importance whether the conductor possess the form of a rope of twisted wire or of a rod, provided it be of sufficient dimensions for the work which it has to perform.

5. If a cylinder or pipe is used instead of a rope or rod, it must be considered as furnishing the same conducting capacity that it would have if slit up along one side and opened out into the form of a flat band.

6. Galvanized iron may be used as a conductor instead of copper, but it must have considerably larger size, because iron is of inferior conducting capacity to copper. Increased size can quite compensate for inferior transmitting capacity.

7. An iron rope or rod, to be equally efficient, must be rather more than double the width of a copper rope or rod. In exact figures the proportional diameters needed are as 6.7 to 2.5. The conducting capacity of iron is five and a half times less than that of copper, or, in more exact figures, as 14 to 77.

8. A galvanized-iron rope conductor should, in no circumstances, be less than eight tenths of an inch in diameter.

9. When a strip or tape of copper is used in place of a rope or rod, it should be in no case less than three quarters of an inch broad and one eighth of an inch thick. Such a strip contains a sectional area of a tenth of a square inch.

10. Galvanized iron, when used in the form of a strip, should be four inches wide and an eighth of an inch thick. Such a strip would contain a trifle more than half a square inch of sectional area.

11. A lightning-rod must be absolutely unbroken, or of continuous length from end to end.

12. When metallic water-pipes, or other similar stretches of metal, forming part of the structure of an edifice, are made to do service as lightning conductors, all joints must be carefully made good by solder, and tested afterwards to ascertain the sufficiency of their conducting capacity. Without this precaution, the arrangement is liable to be a source of danger, instead of a means of safety.

13. It is quite unimportant how a lightning-rod is attached to a building. It does not need insulating fastenings; ordinary metal clamps of any kind may be quite safely employed, provided the rod be of good conducting capacity, and otherwise efficient.

14. The rod must be terminated above in metal points, well projected up into the air.

15. The terminal points may be made either of copper or of iron, but they must be tapered out very gradually, and be perfectly sharp. An alloy composed of 835 parts of silver and 165 parts of copper forms an excellent material for tipping the points, because it enables these to preserve, for a long time, their sharpness under the circumstance of exposure to moist air. The silver tips should be made about two inches long, and be firmly screwed into the termination of the conductor.

[1] Page 70.

[2] *Conducteurs aciculaires, mais à faible section.*

16. The air-terminal of the conductor should be branched out into several points. Multiple points — or aigrettes, as they are termed — of this kind are now made in copper, of very good form, by all the best electrical engineers.

17. The larger the building that has to be protected, the more points or clusters of points should be used. In the case of buildings of any considerable extent the conductor itself must be branched out to all parts, and each branch must end in its own projecting tuft of points.

18. Terminal points should project into the air at least eight feet beyond the building itself.

19. The general idea may be kept in mind that lightning conductors approximately protect a conical space around them whose base is four times as wide as the conductor is high. This principle, however, is not an infallible one, and it must not, therefore, be too implicitly relied upon. Whenever any parts of a building approach towards the limiting surface of such a conical space, additional points should be fixed there, and be brought into connection with the general system of the conductor.

20. The bottom of the conductor must be carried down into the earth, and be connected with it by a surface-contact of large extent.

21. About the best earth-terminal that can be contrived consists in connecting the end of the conductor with the iron main of a gas service or water service. The end of the conductor should be attached to a broad piece of copper or iron, and this should be laid close along the metal surface of the main underground, or, where practicable, be even attached to it by some kind of solder.

22. Where there is not the opportunity for adopting this expedient, the lower end of the conductor should be placed in a shallow trench, opened out twenty feet in the moist ground, and be carried along in it to the east, and be also well packed round with gas coke, broken into small pieces, before the trench is covered up with earth.

23. Plates of copper or iron may be used as earth-terminals, if this be preferred. The plate should not then, however, in any case, furnish less than two square yards of earth-contact, reckoning both sides, and it must be carefully riveted and soldered to the conductor, and be surrounded with broken coke, before it is buried up in the earth.

24. When the earth is unavoidably dry, the earth-contacts of the conductor must be made proportionally large. Abundant size may be so managed as to compensate for the disadvantage of dryness.

25. With dry earth-contacts, lightning-coils may be a source of danger instead of safety, if this precaution be not observed. The only means by which it can be ascertained whether a dry earth-contact has been made large enough is the employment of the galvanometer. This test should never be omitted when the conductor terminates in a dry soil.

26. The danger of a lateral discharge from a lightning conductor diminishes with its capacity. A large, well-pointed, and well-grounded conductor will convey a very powerful discharge to the earth without the slightest tendency to strike through any object external to the roof. A small and imperfectly appointed conductor, on the other hand, is always prone, during the transmission of lightning, to flash off some portion to surrounding objects.

27. The capacity of a conductor may practically be increased in three ways to insure this efficiency and safety: (1) by the employment of larger ropes or rods; (2) by a more abundant service of points; and (3) by amplification and improvement of the earth-contact.

28. The proof that a conductor has been made capacious enough by the judicious employment of these means is furnished by the magnetic needle of a galvanometer not being materially deflected when a galvanic current is passed through the conductor to the earth.

29. All large masses of metal contained in a building should be metallically connected with the lightning-rod, unless when such are liable to be occupied by living people during a thunder-storm, as in the case of an iron balcony fixed outside a wall in front of a casement; it is then better that such masses should not be connected with the conductor, because, under such circumstances, persons standing upon them would be in less danger of being struck. When they are connected with the conductor there is always some risk of persons standing upon them furnishing a path for the lightning to the conductor.

30. The best method of connecting masses of metal with a conductor is by closed circuits; that is, a connecting metallic band should proceed to them from two different parts of the conductor.

31. Soft-metal gas-pipes must never be allowed to run anywhere near to a lightning conductor, because there is always danger when they are so placed of some part of the discharge deviating from its proper route to avail itself of the good earth-contact furnished by the expanded mains of the gas supply, and in doing so of melting the small fusible gas-pipe and setting fire to the gas.

32. Zinc or iron pipes on the tops of chimneys are always to be regarded as masses of metal that are to be brought into connection with the conductor.

33. Lofty chimney shafts may always be satisfactorily protected by a single conductor. Care must, however, be taken that the size of the conductor is adequate for the height, and the top of the shaft must be entirely encompassed by a bar or parapet edge of metal, and points must radiate from it on all sides into the air.

34. In the case of manufactories where corrosive vapors are emitted from the chimneys, copper or iron terminals should be soldered into leaden tubes, and a subordinate service of points should be added at some lower level, where they would not be liable to be affected by the corrosive vapors.

THE ILLUSTRATIONS.

THE PALACE OF THE TROCADÉRO, PARIS.

The accompanying illustration, which we copy from the *Illustrated London News*, will serve to make our Paris correspondent's letter more intelligible.

HOUSE AT MANCHESTER, MASS., FOR PROF. O. S. FOWLER. MESSRS. CABOT AND CHANDLER, ARCHITECTS, BOSTON.

The site occupied by this house is a rocky promontory on Smith's Point. It is just finished at a cost of $6,500. The builders were Messrs. Phillips and Killam, of Manchester.

DESIGN FOR THE MOORE MEMORIAL PREPARED BY MR. JOHN F. HENNESSY.

This design was presented in competition to the St. Patrick's Society of Brooklyn, who wished to erect a monument in Prospect Park on the anniversary of the poet's birth. The Celtic cross was chosen as being the most appropriate form to give the memorial. It was intended to be cast in bronze and to rest on a granite base. The bas-relief in the medallion was to be copied from Lawrence's portrait of Moore.

DESIGN FOR THE EMPLOYMENT OF SIX COLUMNS, MR. R. D. ANDREWS.

This is one of the designs prepared by the members of the school of architecture attached to the Massachusetts Institute of Technology, Boston, in accordance with the following programme: —

A wealthy amateur of the arts is in possession of the shafts of six columns of rich marble, which he wishes to make use of in the erection of a small building or monument. As these columns can serve equally well to form part of a great variety of structures, each student is left free to choose the subject of his composition. It may be a fountain, well, portico, tomb, or any other structure whatever.

These columns are to be taken as twelve feet long, exclusive of base and capital, which are to be supplied. Any substructure or base that the nature of the composition may require may be added.

Required: A Plan and Elevation, both on a scale of one fourth of an inch to the foot, finished in pencil, with the shadows cast, with or without color.

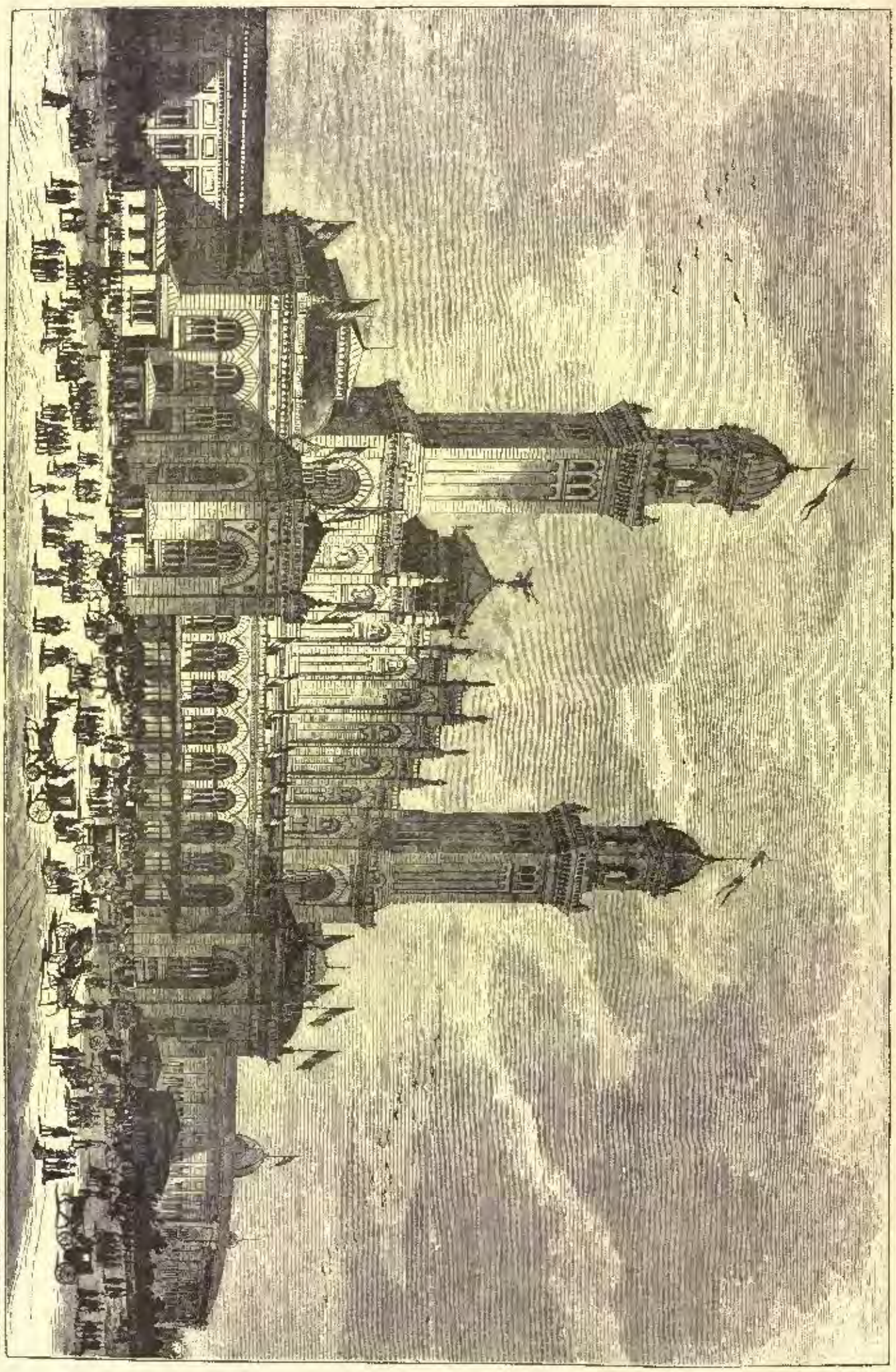
DESIGNS FOR A STONE FIRE-PLACE, — COMPETITION NO. IV.

MONREALE.

Monreale, *Mons Regalis*, almost tells its story in its name. It is the royal mount of William the Good, crowned by the church and city which arose out of no great need of his kingdom, ecclesiastical, military, or commercial, but simply because the spot was hallowed by associations personal to himself. Our notions of ecclesiastical geography are startled when we stand at one of the gates of Palermo, and see on the hill-side at so small a distance the metropolitan church of another province. Archbishops are certainly thicker on the ground in Southern than in Northern Europe; but we are hardly prepared to find one in this way almost at the gates of another. On the spot where the church stands King William believed himself to have been honored with a heavenly vision. That the vision should be commemorated by a church and monastery on the spot was almost in the natural order of things. That a town should grow up round the monastery was also almost in the natural order of things; a crowd of English boroughs have sprung from such an origin. But that the monastery should contain the throne of a new bishop, of a new metropolitan, that a new diocese and province should be marked out for it, that the little town which gathered around it should become an ecclesiastical metropolis, is what certainly no one could have looked for. It shows how dearly the good king loved his own creation. And Englishmen will naturally ask another question. Monreale, as we have implied, was one of the very few episcopal churches out of England which were served by monks instead of secular canons. Among the ecclesiastical changes of the Italian kingdom the monks of Monreale have shared the fate of other monks. But as the metropolitan of Canterbury is still installed in his place as abbot of Christ Church, so the metropolitan of Monreale heads the pastoral in which he calls on his people to weep for Pope Pius and to rejoice for Pope Leo with the style, episcopal, monastic, and baronial, of "Arcivescovo ed Abate di Monreale, della citta e dello stato signore." But how came this specially English use into the Sicilian church? Was it prompted by Queen Joan or by Archbishop Walter? Master Thomas Brown had, we fancy, gone back to his place in King Henry's exchequer before the church of Monreale was founded.

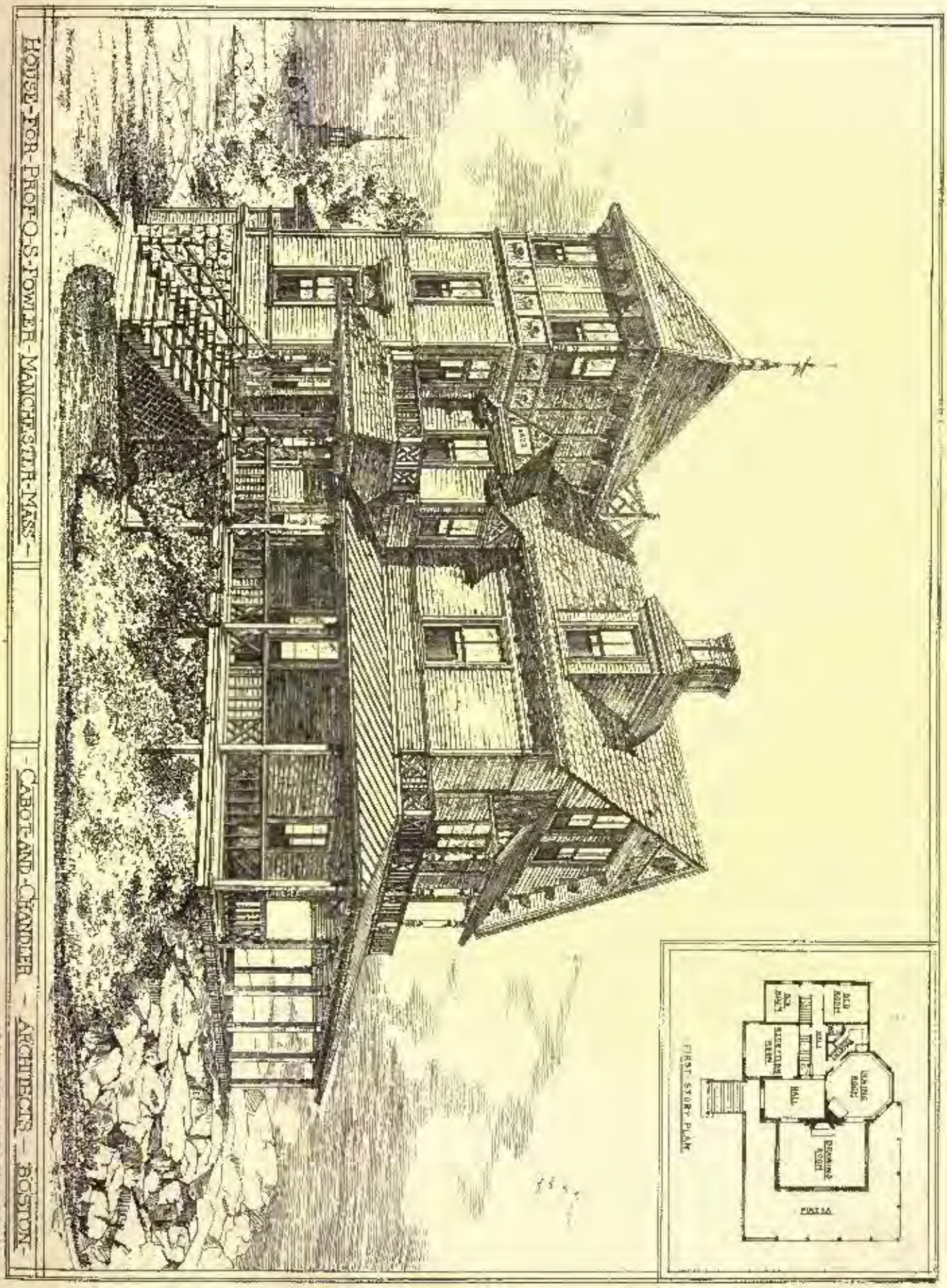
From the gate of Palermo, from any favorable spot of the city or its neighborhood, we look up at the church and town of good King William nestling on the mountain side, with the height crowned by

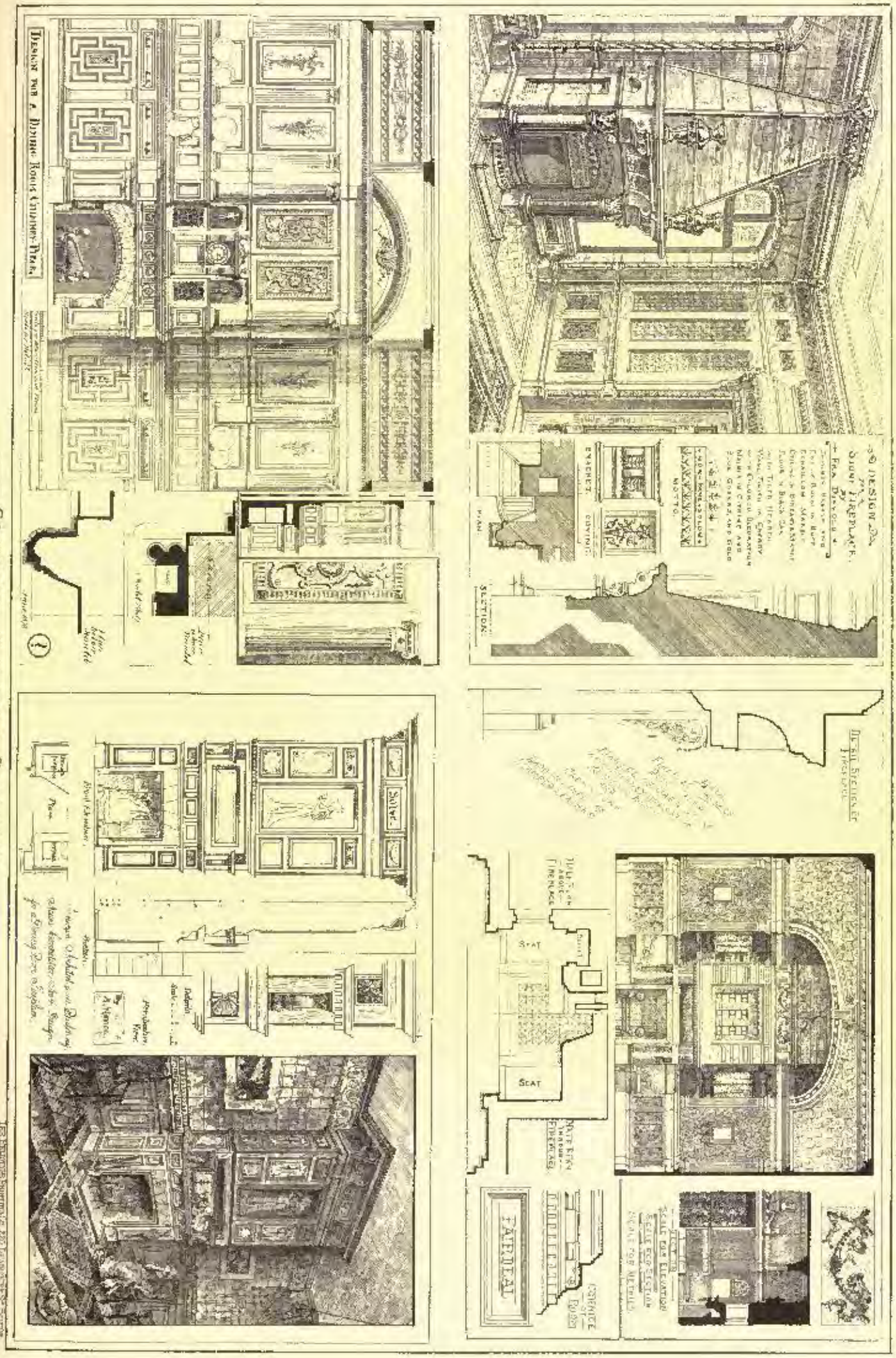
Design for the "Moore" Memorial.



THE PARIS EXHIBITION BUILDING AT THE TROCADERO

The Heliotype Printing Co. 220 Devonshire St. Boston


HOUSE FOR PROF. S. FOWLER MANCHESTER MASS.
CABOT AND CHANDLER ARCHITECTS BOSTON
FIRST STORY PLAN
BED ROOM
BED ROOM
RECEPTION ROOM
HALL
LIBRARY
DRESSING ROOM
PIAZZA



COMPETITION IN INTERIOR DECORATION
DESIGNS FOR A STONE FIRE PLACE

a castle,— whose examination must be left to Alpine climbers,—soaring above it. And from the road which winds up alongside of the royal mount we do indeed look on the Golden Shell, on the hills, on the shore, on the city which lines it, on the headlands which guard the inner sea, on the broad Mediterranean spreading boundlessly beyond them. The *campagna*, once golden with corn, has changed to an expanse of olive and orange trees, with houses and villas dotted among them, with the bare limestone mountains rising over villages and monasteries on their sides, and fencing in the whole favored region. We look down on the whole history of Sicily, but with one blank forcing itself on the mind, to which it is a kind of mockery to give an answer which is little more than formal. We look down on the proud city, and count up its endless lords — Phœnician, Roman, Gothic, Byzantine, Saracen, Norman, Angevin, Spanish, Austrian, and Savoyard. We look down on the battle-field of Metellus and Hasdrubal, and on the bloodier slaughter-place of the Vespers. We look on the city which in distant ages welcomed the deliverance of Belisarius and the deliverance of Garibaldi. But round no spot within our view can we call up the memories which give their first charm to other Sicilian prospects. The Golden Shell was never the territory of a free Hellenic commonwealth. We look to the right of the bay, and we may remember that the hill of Punic Solountum once yielded to the arms of Hellenic Tyndaris; if we are disposed to be liberal of the Hellenic name, we may look to the left, and remember that the height of Heiktè — now the Pilgrim Mount of St. Rosalie — beheld the warfare of Molossian Pyrrhus. But the scene on which we look can hardly be brought by such faint memories as these within the limits of the true Hellenic world. The land and the city on which we look are before all things the land and city which the Roman won from the Carthaginian, and which the Norman won from the Saracen. And the spot from which we look down is that whereon is reared the last and greatest of the ecclesiastical works of the conquering line of Hauteville. The succession of buildings which begins with the small votive church of Robert Wiscard ends with the vast votive minster which arose on the mountain slope at the bidding of William the Good.

The church of Monreale is, from its position, seen far away, and yet it is not an object which really stands out in the landscape. It is not, like so many Sicilian churches, altogether without a tower, but it has nothing like either the tall *campanili* of Italy or the towers and spires of northern lands. It has, in fact, or was meant to have, two western towers; but one only was ever carried up, and that one is of no great height, richness, or beauty. We need hardly say that there is no long line of roof; but there is no outline of any kind. There is no central cupola, only the high choir of the type of churches to which Monreale belongs, a feature which, unlike the central tower or cupola, rather adds to shapelessness than produces outline. Yet Monreale has one external feature of extraordinary splendor which gradually opens on the traveller as he draws near. Tastes may differ as to the merits of the peculiar kind of decoration employed; but there can be no doubt that the east end of the church of Monreale is a perfect triumph in that kind. Mr. Fergusson says that "all the architectural features in the building were subordinate in the eyes of the builders to the mosaic decorations." There is truth in this remark; but it is a little too sweeping. We may admit it to be true with regard to the eastern part of the church. Architecture is certainly sacrificed to mosaic when only a single unimportant window lights the central apse. And of course this has its effect on the outside also. The part of the mosaics within is played without by an elaborate system of surface decorations, blank arcades, circles, bringing in also the element of color. These enrichments have nothing to do with the construction of the building, nothing to do with any of its essential features, as doors and windows. We may well think it a fitter form of ornament when, in a German or North Italian church, the apse is enriched with arcades, put there doubtless for ornament, but which still are brought into a relation with the essential features of the building, such members of the arcade as are needed being pierced for windows. But the Monreale east end is a magnificent thing in its own way, and it is the more interesting as a study because it is clearly the climax of several efforts, some of which were not very successful. In the churches of Magione and San Spirito we find the first rude beginnings of the three apses adorned with intersecting arches, the windows, if there were any at all, being at most cut through them in a kind of incidental way. Whether Cistercians, when the Cistercian order was young, would have run after such an ecclesiastical luxury as mosaics may fairly be doubted. But if they did not mean to have mosaics, why did they not have windows? Anyhow, it is in these two Cistercian churches that these arcaded east ends begin, and they go on vastly magnified in the two metropolitan churches. But the east end at Monreale is an incomparably better design than the east end at Palermo. The east end of our English Walter is a most rich and elaborate piece of work, and we have a further fondness for it because, like the east end of San Spirito, it keeps the Saracenic billet, which is not to be seen at Monreale. But the apses, especially the side apses, have not their full importance; they have an air of being stuck on against the high choir, which here has a very elaborate outside. The high choir at Monreale, if it ever had any artistic character outside, has utterly lost it through modern changes. This may perhaps help to give yet further importance to the apses; but they have of themselves far greater importance than those of Palermo. There are few things more striking in their own way than the three apses when looked at from a little way down the slope to the south side. And we suspect that they typify a remarkable piece of ecclesiastical history. We must remember that the use of the Greek rite prevailed during the earlier days of Norman rule in Sicily. We have spoken already of the very small apses, hardly to be called apses, in some of the smallest churches of that date. At St. John of the Hermits they are in the thickness of the wall. With the coming in of the Cistercians they grow larger, till they reach their climax at Monreale. In the Cistercian churches we may be sure that the Latin rite was always used; so it doubtless was at Palermo, at least from Walter's rebuilding; at Monreale it was of course used from the beginning. The cupola and the small side apses are in short the sign of the new Rome; the high choir and the larger apses are the sign of the old.

Besides the east end there is nothing very striking in the outside of Monreale. The west front is poor, except a single splendid doorway, which comes nearer to northern Norman work than anything else in the church. But how come the two towers to project, after the manner of several examples in Scotland? Perhaps rather, we should ask why the arrangement is followed in Scotland? For at Monreale we may believe that the towers were meant to be united by a portion, which we can hardly fancy in Scotland. A portion there is at Monreale, but not at the west end; it covers the north side of the nave, a specimen of that earlier and better kind of Renaissance which practically does not differ from the more classical type of Romanesque. We pass under its arcade, through the magnificent wrought door with its carvings, into the renowned nave of Monreale. On what do our eyes rest first? That is a matter of taste and habit. Some eyes will fly at once to the colored splendors of the mosaics; others will light, even before the mosaics, on that of which the mosaics are after all but the festal dress, on that noble range of columns which makes Monreale a rival of Pisa. While Palermo was still Saracen, the men of Pisa had carried off trophies from her harbor, and with them they had carried off some germs of Saracenic skill to be pressed into the service of the mighty temple which commemorated their victory. In the double ranges of columns at Pisa the lesser row of arches are pointed; at Monreale the pointed arch is dominant. Arches of that shape rest on the single row of columns which parts off the wide nave from the narrow aisles. Nothing can be less like the sprawling arches of the pseudo-Gothic of Italy than these narrow, stilted arches rising from those mighty shafts; it is like a basilica of the noblest design, like the peristyle of Juvius Libuself, with the pointed arches of Tivyns or Tusculum taught to discharge an artistic function. In all this the nave of Monreale is essentially akin to the nave of the palace chapel on a greater scale. But with the nave the likeness ends. At the palace chapel everything fits into everything else; nave, cupola, apse, are all bound together, and form a single whole, — a whole far more perfect than Pisa. At Monreale Mr. Fergusson's criticism, minute of the nave, is most true of everything east of the nave; it is a mere display of mosaics, and nothing else. Wash over all the mosaics, the nave, like the palace chapel, would still remain one of the noblest of strictly architectural compositions; the eastern part would lose all beauty and interest, except that which it is hard in any case to take away from the bold sweep of the apse. But the high choir, with four arches of different heights and widths, with not a single column, nothing but square surfaces, is a wretched substitute indeed either for the cupola of the East or for the soaring lantern of the North. Four arches, forming a kind of crossing, make us ask for one or the other; but the prayer for either is disappointed.

It is well to insist on both the merits and the defects of this wonderful church strictly as a work of architecture, because to so many eyes it seems to be hardly a work of architecture at all, but a mere display of color. The capitals are worth a study, though they show but few patterns. A few of the columns keep their classical capitals, which quite cover down below the vast overhanging *quasi*-abaci; but most of the columns are fitted with capitals evidently made to suit the abaci, classical, but with the *cornucopiæ* to play the part of the volute, a type seen also in the church of Magione. In the extreme eastern parts we again get a few columns, smaller, and in some cases coupled. The mosaics have been discussed over and over again. We will mention two or three points only. While there is a great deal of Greek at the palace chapel, there is very little at Monreale, and the Latin in some places runs off into strange forms which are said to belong to the local dialect. This is a most important element in the puzzling question as to the language of Sicily. Secondly, the ark distinctly rests on *two* Ararats, very much as they are drawn in Mr. Bryce's book. Thirdly, Abraham's ram is caught in a thicket which looks very like the cactus so commonly seen in the island, and yet botanists tell us that the cactus, like the prickly pear, came from America. It is well, though it involves leaving the nave for the high choir, to turn from such thorny questions and look at the mosaic of the coronation of William the Good, placed over the throne which, here as elsewhere, marks the sacred character of the Sicilian monarchy.

So, among all the various capitals in the famous cloister — each one is a study — the one which comes home to us most is that which records the founder's offering. Remembering Arles, Moissac, Aosta, a crowd of others, the Monreale cloister must be allowed to hold the first place in its own class. Above it on one side rises the long

range of lancets of the forsaken refectory,—the archbishop and abbot of Monreale holds his lower rank as a sinecure,—and another such range marks the dormitory. From the cloister garth the church rises above the endless ranges of columns and wrought capitals; the mountain with the castle rises again above the church. If one of M. Viollet-le-Duc's immortal students could drop from the clouds into the cloister of Monreale, he ought to feel at once that he was within the precincts of a Sicilian monastery, as, if he were in the like sort dropped into the cloister of Wells, he ought to know that he was within the precincts of an English secular college. King William's Benedictine house, built after true Benedictine rule, is a relief after the endless monasteries of Palermo, built mostly after no rule and no shape at all. Before the traveller goes down the hill, let him once more go within the church; let him gaze on what else he will, but let him, as his farewell to Monreale, make his way to the south transept, the resting-place of the two Williams. There William the Bad sleeps in the sarcophagus found for him by the filial duty of his son, while William the Good owes his tomb and epitaph to the piety of an archbishop and abbot many ages after.—*Saturday Review.*

CORRESPONDENCE.

THE PALACE OF THE TROCADÉRO.

Paris, June 7, 1878.

Last week the completion of the roof of the second of the two great towers left the Palais du Trocadéro completely finished. Naturally, a building which will be for all time one of the greatest French monuments has called forth much criticism, or rather discussion; for, apart from the architects, political bias generally asserts itself too strongly to allow fair criticism. When the republican proudly hands the new monument the sincere imperialist cannot openly agree with him; the least he owes his party is a shrug of the shoulder. As a rule the building is pronounced by the architects a success, especially when it is remembered that the immense structure and its foundations have been completed in about eighteen months, an extraordinary feat for the deliberate French architects, who usually are allowed a deal of "potering," as we should say, over their work. The foundations gave unexpected trouble, because of the site having been quarried formerly and loosely filled in again, and in places had to be begun twenty metres down. The architects have shown themselves men of greater energy and capacity than was expected by the profession, and their rivals honestly concede it. M. Bourdais is rather more engineer than architect, while his partner, M. Davioud, is a thorough artist, with long experience, and in his designs was, in the present case, ably assisted by M. Rulin as his chief inspector.

Architecturally the real front of the building is what the public call the back, that is, not the façade facing the Champs de Mars, but the one towards the spacious square which, adorned with a huge spray fountain, crowns the hill of Chaillot, and from which avenues radiate in all directions. The entrance to the hall should be by a vestibule or *salle de pas perdus*, sixty-one metres long, extending its shelter by a glass *marquise*, and flanked by pavilions in which are iron staircases and columns supporting cupola vaulting with iron ribs, as at the Bibliothèque St. Geneviève. Behind this part of the building rises the great gable, divided into square-topped bays *en échelon*, which marks on this side the roof of the amphitheatre. The gable is flanked by two square belvedere-capped towers, whose platforms are eighty-two metres from the ground. These are provided with elevators for visitors, who can be lifted some ten metres higher than the towers of Notre Dame. At present the public pass by this advanced *corps de bâtiment*, and enter on each side under two long, rectangular pavilions, whose first floor contains halls devoted to conferences in art and science, and whose ground floor forms open vestibules. The ceilings of these halls are supported on eight massive marble columns. Here, as throughout the building when possible, the iron beams are frankly shown, and are filled in with plaster or terra-cotta. No wood is used in the construction of the building.

From these vestibules the visitor may reach the stairs and elevator, or turn at once into one of the long elliptical galleries, thirteen metres wide, in which now are exhibited the loan collections of historical curiosities, or, passing through, may descend at once into the grounds beyond; but let him follow the throng, and he will find himself in the lower of the two circular porticoes which surround the amphitheatre. These magnificent galleries, some six metres wide, are not idle decorative features, but are justified by the surpassing view from them. The eye sweeps from the height of Montmartre on the left over the whole of Paris, with all its domes and towers. Of all its monuments only two are hidden, the Arc de Triomphe and St. Augustin, and the eye ranges far across the dwindling suburbs to the green hills on the right, and again follows the steamers up the river to the gay scene just opposite. Here the shining roofs on the Champs de Mars with their countless flags, and the grounds swarming with restless figures, confuse the brain, and one gladly turns to the nearer scene on the slope on this side of the river, where, half hidden by foliage, are picturesquely scattered pretty chalets and pavilions of varied architecture. But especially is the tired eye soothed as it rests upon the large basin below, with its jets of spray. Into it daily fall thirty thousand cubic metres of water, over a series of eight wide basins flanked by two smaller series of cascades and jets. The source of the water is at one's very feet; for, taking advantage of the falling ground, and to mask the lofty basement, a terrace has been built out a few steps below the lower portico. Here from a projecting elliptical basin a clear sheet of water falls some nine metres, half veiling the arch of the grotto underneath. The effect on the tired sight-seer is delicious, and an eager crowd is always pressing forward to watch from above the falling waters, or below passing into the grotto to look wonderingly at the view through the clear crystal sheet. The terrace is enriched with six colossal figures of the continents in gilt bronze, and of the same material are spirited statues of a rhinoceros, an elephant, a wild ox, and a horse, placed at the angles of the great basin below. The cascade at present looks bald, but when the vases in the original design are placed along their sides this may disappear; its chief fault is want of height for the slope. At any rate, the view from this point will be to many the most notable thing in the Exhibition, and their most agreeable memory.

The two stories of porticoes above mentioned are inclosed within twenty-nine round arched bays, and give easy access to an admirable series of corridors and stairs leading into the hall itself. On entering one is struck by the airiness of the great circular hall, which, with a diameter of forty-five metres, and thirty-one metres high, crowned by a flat, conical ceiling, as in the Cirque d'Hiver, gives an impressive effect. A segment is cut from one side to form a wide and shallow niche for the orchestral platform. Ample light streams in from nine huge round-arched windows, scantily filled with the baldest mullions, which both inside and out are fatally ugly. The bays are continued down below the window, and include tribunes cleverly lodged between the projection of the deep, square, outer buttresses, and hidden by the roof of the porticoes. The seats slope rather steeply down to a range of open boxes on a lower level, and these are high enough to give room for covered boxes beneath. As the rows of amphitheatral seats beginning at the sides increase in number towards the middle, the parquet takes a horse-shoe form, and avoids the dryness of concentric circles. There are about 4,500 seats, exclusive of the ample accommodations for orchestra and choruses on the platform. The decoration shows haste, but in general is light and harmonious in tone. The groundwork is of a dull yellowish bronze tint, much the fashion here now, though M. Garnier failed to make it attractive in the Opéra. Here it is agreeable enough as contrasted with panels and bands of dark red below, and with the pale green of the ceiling above. The difficulty of arranging a vast flat niche surmounted by a segmental arch in a circular hall is not satisfactorily met, but attention is diverted from this by a successful painting by Charles Lameire in the space over the arch. It represents France calling around her the nations. Painted in pale, flat tints, with strongly marked outlines, it is in its simplicity a fine example of architectural decoration. The hall has turned out good in its acoustic qualities, and is well ventilated.

After this general description let us approach the building from the Champs de Mars, for which view it was especially designed. This façade more frankly explains its uses than the other. The rotunda with its open galleries suggests a festival hall, and the towers which flank it, apart from the valuable accent they give, may be explained as gala features, in spite of their solidity. The long wings faced with colonnades suggest museums and collections for the public. The proportions in themselves are agreeable, and so the vast edifice, essentially modern in its architecture, presents itself with grace and frankness. There is one serious criticism to be made: these porticoes,—which by the way are not semicircular, as generally termed, but halves of a flat ellipse,—in spite of their extending some four hundred and thirty metres, appear mean and insignificant. Nothing but near approach to them will convince one that they are in reality monumental in proportion, with a width of about six metres. The architect evidently expected to show the enormous size of his central feature, about fifty-eight metres in diameter, by contrast with these colonnades, which he was at pains to subdivide by lesser pavilions. But just the opposite effect is produced; instead of porticoes, really of ample size, giving a colossal scale to the central part, the latter is taken as the normal scale, and the galleries are dwarfed. It is the ever-recurring problem, perhaps the most difficult in architecture, of how to give scale. Up to a certain point subdivision will give a desired scale, but that point passed the parts before taken as units suddenly become fractions, and the scale drops, as in this case. It is not easy to show what would make it otherwise, but certainly it was a fatal mistake to divide the immense windows of the rotunda into only four divisions, and with mullions really good-sized columns. These great bays are very conspicuous, and, catching at first the eye, give a false scale. Had they been subdivided, as in the best Gothic windows, it would have been very different. There are many minor criticisms which might be made, but they can hardly be of interest far from Paris. It is more interesting to note the agreeable tone of color which adds a charm to the building. It is of pale yellow stone; the more constructive parts emphasized by alternate courses of a reddish stone, which, with the towers, give an Oriental aspect. Narrow bands of red and green mosaics are effectively introduced. The walls of the porticoes, of soft Pompeian red, give a rich relief. The style of architecture, though borrowing here and there, is homogeneous from its thorough constructiveness and *raison d'être*. H.

Bricks in India. — The native brick now used in India is five inches by three inches by one inch.

THE DULL SEASON. — THE NEW ARCHITECTURAL PROFESSORSHIP. — COUNTRY HOUSE AT ISLIP.

NEW YORK.

AT the office of the Superintendent of Buildings it has long been noted that the fortnight between the 1st and the 15th of July is the most laggard time of the entire year; about one plan per diem is then the average, and there have been weeks when but two plans were offered. But while matters are dull at the special headquarters they are not really so among the offices. A few of the architects who were fortunate enough to have commissions early in the spring are busy, and there are a few rumors of new projects afoot.

In the matter of the falling tunnel the jury's verdict puts the blame upon the contractor and the inspector, the one for loading and the other for permitting the placing of the superincumbent earth in a manner other than that called for in the specifications, namely, by layers of uniform depth.

The really important thing of the past few days is the appointment of Mr. Russell Sturgis, Jr., to the post of Professor of Architecture and the Arts of Design at the College of the City of New York. This is the great free college in which the school system of the city finds a fitting culmination. It is a hard-working college, too, with a course to accomplish which requires work on the part of the students. Mr. Sturgis is an alumnus. The subject of architecture has been curiously treated during the twenty-five years of the existence of the college. While the mathematical and classical sections of the course were attended to by able specialists, drawing and architecture were placed under the care of an old German refugee of 1848, whose opinions on all subjects were very fixed, but what those opinions were nobody either inquired or cared to know. He has gone, and in his place one graduate has been already installed as professor of drawing, and now another is chosen to the new seat of architectural instruction. New York, with such a man in such a position, will rank with Boston, Cornell, and Ann Arbor as an architectural school. The experiment — for such it is — promises to create no small amount of criticism, and with a man of such energetic enthusiasm for his art as Mr. Sturgis possesses, the matter will be made interesting, however it may result.

Mr. Richard M. Hunt has lately designed a country house for Mr. Wm. H. Vanderbilt, and the work is now going on near Islip, L. I., where Mr. August Belmont and Mr. Lorillard already have fine country places. In a general way the plan measures 85 × 86 feet, but is of such an irregular form that the building appears much larger. The building is two and a half stories high, in half-timbered work, with broad, slated roofs, truncated, and of so many and various slopes that a wonderfully picturesque effect is secured for a building so broad and "squat," for there is nothing in the shape of a tower. The main feature of the place is a great hall 20 × 60 feet and 14 feet high; running through the building, and opening from one side of this at right angles is another hall 20 × 20 feet. At one end of the long hall is the main entrance; beside it, to the side, is a deep window-seat, looking out upon the veranda, which extends two thirds of the distance about the house. Opposite the side or jutting hall is a grand fire-place, massive with brick and stonework ten feet wide and running up to the ceiling, the fire-place lined with brick, but otherwise built of stone. At the end of the main hall, opposite the principal entrance, is the wood staircase running up a half story and then turning at a broad landing-stage. Rising from this landing-stage to the second floor ceiling is a great window, almost church-like in size, but made up of small windows closely grouped. It is about fifteen feet square and lights the halls above and below. It is glazed in cathedral glass, with the colored bull's-eyes introduced at the centre of each subdivision of the window. The stairs are to be white ash, while the hall itself is to be in oak panel-work, showing a timber roof; at the end of the side hall, facing the southwest, is another large window, completely occupying the end of the hall; three deep mullions divide the space into four separate lights, which, running from floor to ceiling, give opportunity for a broad field of colored glass. The upper hall has a fire-place over that on the first floor, but of more modest proportions. In one of the outer angles formed by the intersection of the two walls is a parlor nineteen feet square, and in the other a guest's bedroom — the only one on the first floor — which, with a bold bay, plenty of windows, and exterior doors, is a proper hot-weather chamber. Behind the fire-place is the dining-room, entered by two doors, one on either side of it; a commodious fire-place has been fixed in the dining-room, which is also finished, like the hall, in oaken cabinet-work.

Window-seats are a favorite feature, and are placed here and there in hall, dining-room, and bedrooms, in a most inviting fashion; at the head of the first flight of stairs the sill of the broad window above mentioned is turned into a cushioned seat.

Without, the building may provoke criticism. The windows, broad or narrow, long or short, as best suited the interior arrangements, seem to jut out in a miscellaneous way, and over the main doorways a bold hood answers the purposes of what is known in America as a *porte-cochère*, and the highest point is the cresting of the main roof, above which line the chimneys rising from the lower roof do not extend. The broken roof outline gives opportunity for some good light and shade effects. The entire cost will reach $60,000.

W.

LAUSANNE. — LAKE DWELLINGS. — Lake dwellings have been discovered at Latten, Switzerland, at the junction of the rivers Limmat and Sihl.

FIRES IN THEATRES.

A FEW additional statistics, taken from the list of theatres destroyed by fire, contained in the work of Herr Fölsch, will teach us, if instruction were needed, how highly dangerous our modern stages are. Nearly every theatre in London and Paris has been burnt down in its turn; in London alone, to the number of thirty-one. During the last thirty years, fifty-seven fires were officially recorded in London, and a great many fire alarms may have never come to the knowledge of the authorities. No better criterion of the combustible nature of play-houses can be formed than by looking at their respective ages. The author has been able to collect exact data with that view of 252 theatres. Of these, there have been burnt down:—

5	theatres	before opening	
70	"	in the first 5 years after opening.	
38	"	6 to 10 years after opening.	
45	"	11 to 20	" "
27	"	21 to 30	" "
12	"	31 to 40	" "
21	"	41 to 50	" "
17	"	51 to 60	" "
7	"	61 to 70	" "
8	"	71 to 100	" "
3	"	over 100 years after opening.	

Total, 252 theatres.

The abnormally great number of theatres burnt down in the first five years after being opened is explained partly by the fact that most of them were wooden erections, or merely provisional buildings, which, of course, are of the most dangerous nature. The above figures show that the average age of those theatres destroyed by fire amounts to about twenty-two years and three quarters. Carrying inquiry a little further, we find that the 516 theatres burnt down were distributed over the globe as follows. They included:—

170 in the United States.
68 in Great Britain, exclusive of the colonies.
62 in France.
49 in Germany.
45 in Italy.
26 in Austria.
21 in Russia.
17 in Spain and Portugal.
30 in the various European countries.
18 in the various extra-European countries.

A comparison of these figures does not permit of forming an opinion as to the more or fewer fires in theatres in the different countries; but they are a safe index of the care bestowed there in collecting the required data.

It is further interesting to observe the time when theatres generally burn down. On the average, about thirteen theatres are destroyed each year; the worst months being from January to March, the fewest fires taking place in July to September. Most of them have taken place in the middle of the week, the most fatal days in the month being, strangely, the 8th, 15th, and 22d. Fortunately, of the many conflagrations chronicled in the work, only thirty-six broke out while representations were going on; but these have, on the other hand, been the most disastrous on record. Most of the fires took place in the middle of the night; taking the risk of theatres to catch fire during the day at one, 6.8 represents the liability about two hours after the conclusion of the performance.

Another point, which is generally too much neglected, should not be lost sight of. It is the extreme rapidity with which conflagrations generally spread in theatres, leaving no time to save anything, and involving too often great sacrifice of life. A case in point is the destruction of the Berlin Opéra on August 18, 1843. On that evening the military ballet, "The Swiss Soldier," in which guns are fired and fireworks let off, was represented. At the inspection, half an hour after the end of the performance, there was not the slightest sign of fire. Soon after, however, flames were seen issuing from the right side of the stage, and ten minutes later the whole building was one mass of flame. The old Opéra, like the present one, stood completely isolated, and yet it required the utmost exertion to save the surrounding buildings from taking fire. At the destruction of the Munich Court Theatre on January 14, 1823, it was with the greatest difficulty that another theatre close by, the Royal Castle, and other important buildings were saved. In too many cases it has not been possible to arrest the conflagration, and to confine it to the theatre on fire. Among the many catastrophes of this description of older date may be mentioned the first destruction of Drury Lane Theatre (January, 1672), when sixty other buildings were destroyed; the burning down of the provincial theatre in the court-yard of the Royal Palace of Amalienborg, near Copenhagen (April 19, 1689), when the destructive element annihilated the whole palace, the park with all its buildings, and endangered even the fleet in the roadstead.

Of the more recent fires of this nature, let us only refer to that of the English Opera House (February 16, 1880), when fifteen neighboring houses were destroyed. The fire which broke out in the Olympic on March 29, 1849, either entirely destroyed or greatly damaged twenty other houses. It may be asked, confining the inquiry to London, In how many cases would a fire in a theatre not involve the destruction of surrounding property?

In the work under notice, a list is given of thirty-six fires in theatres which occurred during representations. It is not our intention to particularize them here; but those of our readers who take an interest in them will not regret the time spent in perusing the

part of the book dealing with them. For notwithstanding all that has been asserted to the contrary effect, namely, that fires in theatres rarely begin during representations, and that the catastrophe of Brooklyn was unexampled, they will see that experience says otherwise. Since 1770 no fewer than thirty-six were burnt down while performances were going on, and in most cases the loss of life has been frightful.

There is no doubt that effective measures against fires in theatres are imperative. While searching for the best means for preventing them, an inquiry into the origin of those fires is of great value. But in by far the greater number of instances it has not been possible to trace their causes. In this country the verdict of the jury is similar to that found after the destruction of Covent Garden Theatre, in March 5, 1856, namely, "That the theatre has been destroyed by fire; but that there is not sufficient evidence before the jury to say how the same originated." In other countries where no such juries exist, in most cases, after a fruitless inquiry, the subject is silently dropped. The reason why, only in rare instances, the causes of the fire are established is to be sought in the rapid spread and the destructive effect of the conflagration. The thick smoke arising at once obscures all observation; the extraordinary haste and confusion render even subsequent evidence of eye-witnesses unreliable, and such traces which might possibly lead to a discovery are obliterated by the rapidly spreading flames; so that there remain only assumptions upon which to proceed.

Most certainty exists with respect to fires which break out during performances. They are caused either by badly protected or naked lights, or by leaky gas-pipes, or by careless handling of the gas, or by gas explosions. Other fires have arisen from the employment of petroleum for lighting, or through careless smoking, or through firing of guns, or letting off fireworks. Fires, finally, have been caused by the faulty condition of the heating apparatus. In all these cases, carelessness with respect to all those dangerous appliances has been at the bottom of the outbreak. And yet we are going on in the same course.

It has already been remarked that the rapid inflammability of our theatres arises from the large quantity of material easily set in flames, and stored up within a narrow compass, which has been dried up by continually applied heat, and thus prepared for combustion, but also from the extensive way in which a theatre is lighted up. This danger is considerably increased not only by the frequent use of very thin stuffs, which are on that account set ablaze all the more rapidly, but also by the more or less fine or coarse threads of the canvas employed for decorations, which depend from them after frequent use, and which act like slow-matches for the fire. The dust also which settles on the decorations, and which consists mostly of thin fibres, favors the spreading of the flames, so that in an incredibly short time after they once get hold of the objects within their reach their extinction becomes a matter of impossibility. A fire breaking out must consequently be promptly stifled, or the whole house will be in flames. Experience tells us that such a danger sets in very frequently, or more often than is generally believed in wider circles. — *The Builder.*

THE SUBTERRANEAN WORKS AT WELBECK.

It pleases the Duke of Portland to penetrate his magnificent domain by a series of burrows, and to startle his dependents by unexpected appearances from these subterranean depths. These burrows are no narrow tunnels, but lofty, spacious passages, lighted by costly apparatus for letting in the sun at intervals, and by innumerable gas-lights. Lined with brick and stone, and perfectly watertight, they enable their owner to be everywhere by turns, and nowhere long, unless it please him to go into detail with any of the numerous subdirectors of the extraordinary works, complete and in course of construction, at Welbeck.

The sudden apparition of the duke among the grooms exercising his horses in the great riding-house, whose like exists nowhere else, astonishes, but does not dismay. As his pale face rises from the earth in the left-hand corner of the enormous building, there is no sign of trepidation among those assembled, while their master surveys the magnificent work, raised at a cost which sets calculation at defiance. Nearly four hundred feet long, with a width of rather more than one third, this riding-house, carpeted with tan, has walls of solid stone, and a roof of wood, glass, and iron. Two rows of columns divide it into a nave and two aisles, the latter with beautiful wooden roofs. The great central compartment is decorated with a frieze of painted brass-work, representing birds, beasts, and foliage; while the whole structure is adorned with a stone frieze of elegant design and perfect workmanship.

The Duke of Portland is a builder-up of good work, and a puller-down of bad. An architect at one time employed by him built a gateway, which when completed became abhorrent to him; yet so considerate was he of the artist's feelings that he could not find it in his heart to remonstrate with him. So he tried another way. One night he waited till the architect had driven off in his dog-cart, and then set all his men to work at overtime and double pay to pull down the hated edifice. By morning not a vestige remained, and the architect on his arrival rubbed his eyes in amazement; but neither he nor the duke ever took the slightest notice of its disappearance. There was, too, a memorial bridge erected to the memory of Lord George Bentinck, near the spot where he breathed his last, close to the wood and opposite the village of Norton. Short work was made of this bridge, as of numerous other odds and ends of architecture on the domain, and the present reign of perfection was inaugurated.

The half hundred lodges for keepers and other servants on the Welbeck estates have all been built by their present proprietor, who has in their construction carried out his passion for subterranean work. The dining-rooms and bed-chambers make a handsome little house enough, solidly and perfectly built of stone. The unseemly part of the dwelling is buried in the earth; kitchens, pantries, and other offices are plunged below. Many of the finest apartments in the Abbey itself are actually under ground, and illuminated by all kinds of ingenious devices. Welbeck boasts a subterranean library of great size, whose natural gloom is completely dispelled by gas burners sempiternally aglow. Near this strange room, but above ground, is the riding-house, built by Huntingdon Smithson, from the designs of the Duke of Newcastle, in 1628, now converted into a superb picture-gallery. Of course the gas used at Welbeck is made on the premises, and lofty mounds covered with rhododendrons hide four unsightly gasometers from the eye.

The duke is most interested in what may be called "the works" at Welbeck, — the mighty burrowings and scoopings, the levellings, the widening and deepening of the lake, the building of the new subterranean church, and the manufacture "on the premises" of the rolling stock necessary to the operations in the wood-yard and machine shops, hard by the new riding-house and covered tan-gallop. But he has yet plenty of time to care for the Alderneys with black points which furnish Welbeck with milk, and the black polled Scotch oxen which supply Worksop as well as Welbeck with magnificent beef.

These oddities are viewed with mixed feelings by the inhabitants of North Nottinghamshire. On the one hand, there is the potent incentive to tenants and dependents to exalt the rich man by whose spoils they live; and on the other, a slightly rebellious feeling against territorial absolutism. Ducal freaks are condoned by patronage in the region known as the "dukeries." The last of the "dukeries" is Welbeck, but in notoriety it abundantly supplies the places of all the rest. One of its chief marvels is the tunnel, or rather covered way, built across the park lest any plebeian form should come betwixt the light and the nobility of the Duke of Portland. It seems that a right of way exists across Welbeck Park for foot passengers and pack-horses, — in fact, an old-fashioned bridle-path. Previous Dukes of Portland endured the misery of seeing unseemly figures pass within a quarter of a mile of their princely home, but the present incumbent long since revolted against this infliction, and declared that, as the right of way through Worksop Manor and Welbeck could not be contested, his part of it should be made as comfortable as possible. To that end he constructed a covered way, which, decked with turf, rhododendrons, and other shrubs above, should not prove an eyesore to Welbeck, and by dint of thorough lighting and ventilation should satisfy the public. The public of Worksop and Whitwell is easily satisfied by a duke who employs a couple of thousand workmen, and this flagrant violation of public rights has evoked no village Hampden to denounce it. Is it not a small matter of passing under a road or a lawn, but a mile and a half of tunnel to be traversed by the voyager in that particular direction, and can only be avoided by a tedious *détour*. It is perhaps lucky for the Duke of Portland that his subterranean "Folly," as the country folk call it, is not nearer to Sheffield, or some great town rich enough to care nothing for his patronage, and strong enough to make him pull his ridiculous structure down. As the matter stands, the tunnel, although an illegal and impudent outrage, is only laughed at by the vassals who make a good thing out of Welbeck generally. — *London World.*

GERMAN HOUSES IN CINCINNATI.

Cincinnati

To the Editor of the American Architect:

Dear Sir, — During the past few years a very noticeable feature of house building in this city is what is known as the German tenement house. The house is invariably of brick, generally three stories high, with a nondescript kind of freestone cap and sill to the doors and windows; it is never painted, always has a side entrance (either a side yard or else a portion of the house partitioned off, in which latter case the second story extends over the entrance), and at a distance of some thirty-five feet from the front the one stairway gives communication to the several stories. There are generally four rooms on a floor (two on each side of the stairway). In almost every case these houses are filled with six different families, one family to each suite of rooms, and they all make common use of the above-mentioned single stairway.

The houses cost about $400 per room, and on an average they rent for $50 to $60 a room per annum, which rent yields the owner the very handsome income of twelve to fifteen per cent on his investment. Large numbers of these houses go up every year, and it is seldom that a room is vacant.

While this plan of house-building is, as shown above, a good investment for the owner, it certainly is a very bad investment for the community. This matter of from six to twelve or more families living together in one house, with seldom ever two rooms to a family,

where each does its own cooking, washing, sleeping, and living, must of necessity breed vice and corruption. And what puts a worse face on the matter is the fact that the majority live in this way from choice and not from necessity; they are industrious and could if they chose have neat small houses of their own. C.

THE RAILROADS OF PERU.

ALMOST every one has heard of the late Mr. Henry Meiggs, and knows in a general way the engineering marvels he has accomplished in Peru during the score of years just passed, notwithstanding the obstacles he had to encounter in the way of political disturbances, intrigue, and an impoverished government exchequer. We take from the New York *World* the following, condensed from the narrative of Mr. W. H. Culley, one of Mr. Meiggs's assistants: —

The work originally undertaken by Mr. Meiggs for the Peruvian government comprised the building of several lines of railway that were considered military and political necessities, namely, the Callao, Lima, and Oroya, and the Oroya and Cerro de Pasco railroads, crossing the Andes to the east; the Chimbote and Huaraz Railroad, extending to the north along the westerly slope of the Andes; the Mollendo and Arequipa, and the Arequipa and Puno roads, extending north and eastward, and penetrating the interior several hundred miles, and the Juliaca and Cuzco road, all forming a network of rail that puts Lima into direct communication with all portions of the republic. The contracts were made with a liberality on the part of the government that would have done credit to more prosperous nations. The work was pushed forward with a rapidity and thoroughness unexampled in the history of engineering, when the tremendous obstacles met with in the formation of the country are taken into consideration. Scientific and railroad men everywhere watched the progress of the work in astonishment, as all their theories and predictions of failure were overthrown one after another. Political and physical disturbances, revolutions, and earthquakes retarded the work at intervals, but it was never abandoned by Mr. Meiggs and his colleagues. A little over a year ago the financial depression that had affected other nations reached Peru, and a panic ensued that threatened to put a stop to the work, and the government scrip issued in payment on the contracts depreciated to about 40 per cent of its face value. It was feared by many in this country that Mr. Meiggs would be unable to withstand the shock, and that the work would necessarily be abandoned for years to come; but the panic subsided when it became evident that there was no real cause for it, and the nation began to recover slowly from its effects. Both the government and Mr. Meiggs were determined that the work should proceed, and the latter directed attention to the Cerro de Pasco mines, long since abandoned, in whose depth lay imprisoned the means for finishing the great undertaking, awaiting only the introduction of modern machinery to yield up their great treasures. The government authorized Mr. Meiggs, or any company that might represent him, to issue bonds to the amount of £2,400,000 sterling, bearing gold interest at 7 per cent, the principal and interest being guaranteed by the Republic of Peru, and the means for paying interest and principal were placed directly in the hands of Mr. Meiggs.

All the mineral lands belonging to the government in the Cerro de Pasco district were ceded absolutely to Mr. Meiggs, and persons owning and working claims in that district were allowed the option of continuing their work and paying Mr Meiggs 80 per cent of the ore taken out, or relinquishing their claims to him and receiving 20 per cent royalty. There were fifty-three legal claims of 100 metres by 300 metres, and nearly all of the owners preferred to give them up to Mr. Meiggs and receive the 20 per cent of ore extracted. The death of Mr. Meiggs last year did not interfere with this arrangement, as the contract held good with any persons who might succeed him.

The building of the Oroya Railway, from the seacoast over the summit of the Andes, through the ruggedest country on the earth, is the most stupendous engineering feat of the age. Unlike the overland road in the United States, which reaches its greatest elevation in the Rocky Mountains by almost imperceptible gradients, the Peruvian highway in the clouds begins to climb the steep sides of the Andes at grades that are startling in their boldness and precipitousness. The heaviest grade on the line is 4 per cent, or 211 feet to the mile, and on some of these grades there are curves of 373 feet radius, or in the metric system, which is used exclusively in this work, 115 metres. Some of the curves on the easier grades are much sharper even than this. The road winds up the side of the mountain in a zigzag and oftentimes almost circular path, and at one point there are two tunnels through the side of the peak, one directly above the other, in the same lateral direction. The rarefied atmosphere at the great elevation reached on the summit, presented many new features in railroading, as a locomotive had never before been worked at these heights. It was supposed by engineers generally that it would be impossible to keep up steam above 8,000 or 10,000 feet, and many men eminent in their profession in Europe wrote to Peru, asking how this difficulty would be met. The problem solved itself in a very simple manner as soon as the test was made. Hydrogen is necessary for combustion, and of course, in a rarefied atmosphere, the amount of hydrogen is less than in the same bulk of air where the density is greater. At great elevations it was merely necessary to introduce into the furnace a greater quantity of air in a given time than at the sea level, and the simple operation of opening the dampers wider accomplished this result.

The world-famous Cerro de Pasco silver mines are at the intersection of two immense mineral lodes in the Province of Junin, one running through the Cordilleras in a northeasterly direction, and the other through a spur of the same range with a northwesterly trend. The ore body averages seven eighths of a mile wide by one mile and a half in length, is of irregular shape and unknown depth. The mining done by the Spaniards and Peruvians has all been in the surface deposit, and really amounts to nothing more than prospecting in these days. Their deepest shaft is only 360 feet below the surface, and has been sunk through the decomposed rock forming the surface ore. The shafts vary in actual depth from the surface, which is irregular, but they are all sunk to the same water level. The unstable character of the formation in which these shafts were worked caused many accidents, and working in the old Spanish mines of Cerro de Pasco was a decidedly dangerous occupation. The surface to-day is honey-combed with deep and extensive *sinks* or *tajos*, where the mines have fallen in, and many a miner's bones are entombed in these great sepulchres. The most terrible of these accidents occurred in 1710, when 300 persons were buried alive beneath the roof of a mine, through the giving away of the supporting timbers. All of the top deposit in this district of a square mile is what miners call pay dirt, — that is, it is decomposed rock containing free-milling ore that averages $40 to $45 per ton. The ore remaining in this surface deposit of decomposed rock is sufficient in quantity to run all the mills in Nevada at their full capacity for 100 years.

Below the depths to which the Spanish miners worked their shafts, the diamond drill has been used to prospect the mines. The rock is hard and uniform in character, averaging about $165 to the ton in the assaying. Pockets are frequently struck yielding ore that contains from 50 to 80 per cent of silver.

Professor Raimondi, who has conducted scientific explorations in Peru for many years, is of the opinion that the coal fields of the Huaraz Valley will prove to be the most extensive in the world. The coal is principally semi-anthracite, although cannel and bituminous coal have been found in considerable quantities in the interior.

A DANGEROUS LIGHTNING-ROD.

IN connection with the article which we print in another part of the paper the following letter from the late Professor Henry, concerning a lightning conductor without ground connection, is of interest: —

SMITHSONIAN INSTITUTION.
WASHINGTON, April 27, 1878.

SIR, — The plan of lightning-rod you describe is an extreme application of the method introduced some years ago of discharging electricity by points. It was supposed that a great improvement was made by placing projecting points on all sides of the rod throughout its whole extent. Another supposed improvement was to terminate the end of the rod near the ground in a sharp point. But both these plans are at variance with the true principles of electrical protection, which consists in drawing the electricity from all the space occupied by the roof of the house to the point of a continuous rod intimately connected with the earth by means of water-pipe, gas-pipe, or other masses of metal. The rod should be perfectly smooth, and so constructed as to receive the electricity at the upper end and transmit it silently to the ground.

The action of a positive cloud on the U-shaped rod, shown in the circular you send, would, by induction, render each branch of the U negatively electrified, and the horizontal part positively. In this case a discharge would tend to enter each branch at the same moment, and descend in a current through the middle of the horizontal part into the roof. In my opinion, a rod put up in this manner is worse than none at all. I am very truly yours,

JOSEPH HENRY, Secretary S. I.

NOTES AND CLIPPINGS.

HUDSON RIVER TUNNEL. — Once more laborers are at work on the Hudson River Tunnel, the courts having removed the injunction obtained by the Delaware and Lackawanna Company, and foreign capitalists having subscribed some three million dollars to begin the work. As soon as the old shaft at the foot of Fifteenth Street, Jersey City, has reached the depth of sixty-five feet, work will begin upon the tunnel proper.

LIMESTONE PAVEMENT. — Mr. H. G. Wilson, of St. Louis, who is said to be an expert in the matter of road-making, has evolved the theory that the healthfulness of a city is in great measure dependent on the material used for paving. Finding that the mortality record of the year ending in April, 1878, shows that St. Louis is the healthiest large city in the United States, and that the other large cities, ranged in comparative order of healthfulness, are Cincinnati, Chicago, Philadelphia, Boston, Brooklyn, Baltimore, and New York, he has been led to seek the reason for such conditions. At first suspecting, naturally, that the classification was but an interpretation of the efficacy of the drainage systems of the respective cities, he was led to abandon the supposition by the fact that Chicago, whose natural advantages for drainage are of the worst, and whose artificial system is avowedly not of the best, ranked third on the list. The condition of the streets next fell under his notice, and here again, although much of the pavement of Chicago is of wood, rain-soaked and rotten, it is evidently a healthier city than those cities where granite and other hard stones are used for paving. The streets of St. Louis, on the other hand, are macadamized, the material used being limestone, and to the filtering of ground air through this material, and the giving off of lime phosphates, Mr. Wilson attributes much of the healthfulness of the citizens of St. Louis.

The Rusting of the Britannia Bridge. — At the conference of architects lately held at London, Mr. Carrill, during the discussion that followed the reading of a paper by Professor Barff on his process for preserving iron from rust, stated that he believed "tons upon tons of rust were taken monthly from the tubes of the Britannia Bridge." This statement, which created no little excitement, as it seemed to foretell the speedy dissipation of one of the engineering marvels of Great Britain, has been emphatically denied by the engineers who have charge of the bridge. It is on record, however, that at one thorough cleaning in 1865 forty tons of rust were taken out.

Cleopatra's Needle. — The preparations for erecting Cleopatra's Needle, says the *Athenæum*, are well advanced. Nearly the whole of the iron-work has been removed, and the inscription on the fourth side is at present in an excellent position for examination and comparison with the various editions which have been given of it. There are several points of interest to be observed with regard to the palæography of the older or central line, and that of the two nearer lines with which it is flanked; the former being far superior in workmanship and treatment to the later additions. This is particularly remarkable in those parts which have been covered by sand, and so protected from injury by weather or design. Some of the hieroglyphics are executed in a different manner; the circle, for instance, of the middle column of text is slightly raised at the centre; in the side lines it takes the form of a deep and cup-like depression. It is expected that the work will be completed in about two months' time. The solid base of masonry and granite blocks is being built; above this the Needle will be raised upon a staging, and swung by an armed collar, which will enable the monolith to be balanced, and thus easily transferred from a horizontal to a vertical position.

A Harmony in Yellow and Gold. — The Paris correspondent of the New York *Tribune* gives the following account of some work at the Paris Exhibition, by the Baltimore artist, Mr. Whistler: —

Not far off is a section of a room for the decoration of which Mr. Whistler is responsible. Ever since Mr. Whistler did the famous peacock room for Mr. Leyland in Prince's Gate he has had a reputation as unique in upholstery as in higher walks of art. He is building a house for himself in London; like to other house, of course; meant, perhaps, as a protest against the sudden popularity of Queen Anne fronts in red brick, with their balconies and drawbridges — a popularity which might end in a new form of monotony hardly less tiresome, though in itself immensely better, than the stucco horrors of which so many square miles have come out of the same troughs and moulds. What Mr. Whistler means, like by his pictures, his peacock decoration, and this last caprice in yellow, may be that there is something good in the world of art outside of the conventional world. He calls this room a Harmony in Yellow and Gold. Against a yellow wall is built up a chimney-piece and cabinet in one, of which the wood, like all the wood in the room, is a curiously light yellow mahogany — something very different from the flaming veneer known to the American for generations past, with drunk and straddling pacteras all over it. The fire-place is flush with the front of the cabinet, the front panelled in gilt bars below the shelf and corded, inclosing tiles of pale sulphur; above the shelf is engrained, with clear glass and triangular open niches at either side, holding bits of Kaga porcelain, chosen for the yellowishness of the red which is a characteristic of that ware; the frame of the grate brass; the rails in polished steel; the fender the same. Yellow on yellow, gold on gold, everywhere. The peacock reappears, the eyes and the breast-feathers of him; but whereas in Prince's Gate it was always blue on gold, or gold on blue, here the feather is all gold, boldly and softly laid on a gold-tinted wall. The feet to the table-legs are tipped with brass, and rest on a yellowish brown velvet rug. Chairs and sofas are covered with yellow, pure rich yellow velvet, darker in shade than the yellow of the wall, and edged with yellow fringe. The framework of the sofa has a hint of the Japanese influence, which faintly, but only faintly, suggests itself all through the room. Its lattice-work back and wheel-patterned ends might pass for bamboo; the carpentry is as light as if the long fingers of a saffron-faced artist had coaxed it into shape.

Gobelins Tapestry at the Paris Exhibition. — The Gobelin manufactory now employs only fifty-three workmen, twenty-two of whom are engaged in making "la Savonnerie" carpets. The tapestry workers are very indifferently paid. But it appears there is no difficulty about recruiting for the Gobelins, on account of the prestige which is attached to the place; because the tapissiers are lodged, because each man has a little garden in the grounds surrounding the hotel, and because when old age comes on, a pension of from forty to fifty pounds a year is granted. The Gobelins, too, is a kind of family concern. The tapissiers are tapissiers from father to son. M. Duruy, who was minister of Public Instruction under the empire, — and a good and liberal-minded minister, too, — belonged to the family in question. His father was one of the head workmen at the Gobelins; he himself was an apprentice, and two of his cousins and several other relatives are to-day in the establishment. As a specimen of "la Savonnerie" work two carpets are exhibited, the price of which is enough to astonish one, even after the tapestry. One carpet, destined to cover the apartment at Fontainebleau which was inhabited by Pius VII. during his captivity, is eighty-three metres square and cost twelve thousand pounds. The smaller carpet, also destined for Fontainebleau, and which is not finished, is forty-eight metres square. There is a tendency on the part of the present director of the Gobelins to give up copying pictures and to confine his tapestry to the decorative art; and this idea has been highly approved of by critics. — *Pall Mall Gazette.*

Bending Wood in a Dry State. — Messrs. Bahse and Baendel have proposed the following method for bending hard wood when quite dry, chiefly for sieve hoops: Two rollers are used, one above the other, the upper one having less velocity, so that it acts by holding back, while the lower extends the wood fibres. When the board, thus bent, leaves the rollers, it is fastened in the mouth of the sieve. The upper roller is fluted, the under one smooth. If two smooth rollers were used a very much greater pressure would be necessary.

Plumbing Hints. — The correspondents of the *Plumber* often furnish some practical hints which are worth repeating. Thus, one plumber says that to prevent the waste-pipe of safe-pans under water-closets from giving passage into the upper parts of the house of kitchen or cellar smells — for these pipes usually stop over the kitchen sink, or over a sink in the cellar — the waste-pipe should be turned up at its lower end so as to form a slight trap; then the orifice is enlarged with a trumpin, and a light rubber ball is put in, so that if the water in the trap dries up the ball may still trap the opening. A perforated plate or wire netting keeps the ball from being thrown out by the rush of water, while it offers no material hindrance to its passage. Another plumber mentions an empirical way of determining by inspection for what purposes the different pipes inclosed in the same casing are used. He says that after a few months' service only the hot-water pipes will show the cleanest exteriors. The circulation pipes will be less clean, while the cold-water down pipes will be much dirtier, and the pressure pipes will be the dirtiest of all.

Drawing in French Colleges. — The Minister of Public Instruction has arrived lately at an important conclusion. Henceforth instruction in drawing will be obligatory in the colleges in all the classes from the sixth to and including the classes in philosophy. The course will include instruction in linear drawing, perspective, ornamental design, elementary instruction in anatomy and the proportions of the human figure, and finally in drawing the human figure from the flat and from the round.

Tin Mines. — The mines of Cornwall, for a long time thought to be the only tin mines in the world, are finding serious rivals in the tin deposits of Tasmania. Four years ago the value of the exports of tin and tin ore from this island was $35,000, while last year it amounted to nearly $1,500,000. One of the most productive regions is the Mount Bischoff district; but this has now been eclipsed by the discovery of a tin mountain at Mount Heemskirk, on the west coast. The "wash-dirt" is some twenty feet thick, and produces about 2½ per cent of tin; but the existence of solid seams of the metal, traversing the mountains in veins several feet in depth and width, has been demonstrated. Some "nuggets," weighing several hundred-weight each, have been found, yielding nearly cent. per cent. of pure metal. Mixed with the tin, too, is a small quantity of gold, about ten ounces to the ton, not sufficient in itself to render it worth seeking, but adding considerably to the tin miner's profits.

Street Sprinkling. — The city of Paris sprinkles not only the planted alleys, the squares, bridges, quays, but also those parts which are watered by the land tenants. The operations last from March 15th to October 15th for metalled roads, and from April to September for the paved ways. Water is thrown daily by means of water tanks, or hose and nozzle, the latter being used on the boulevards and some of the more important streets. Tanks and hose, with their frames, belong to the city, contractors supply horses and drivers, — the whole being under the supervision of the city. The best tank used is the tank Soby. It is an oblong box made of sheet-iron, has a seat for the driver, whence the tank can be worked. The tank contains 840 gallons, and works on a strip 15 feet wide at each passage. It is emptied after a run of from 1,500 to 2,000 feet, according to its capacity. The filling is done by a leather or India-rubber hose, screwing to hydrants under the sidewalk, and so spaced that the tanks have short distances to run when emptied. One tank suffices for an area of 2½ acres of metalled surface, or 5 acres of paved streets. Hand sprinklers are used for the planted alleys: the hose is screwed to hydrants placed at suitable distances, and the apparatus, which is from 40 to 46½ feet long, can with a head of 50 feet throw a jet of an amplitude of 40 feet. One man can, with this apparatus, sprinkle 5 acres in 35 minutes, time employed in moving being deducted. It is economical and convenient, and its use has been largely introduced into the interior of the city. There are 522 tanks in use, which consume a daily average of 1,600,000 gallons. The cost of each tank, including driver, is $48 per month. Hose sprinkling, all incidentals being counted, costs a trifle over one half the expense of water-tank sprinkling. This chapter would be imperfect without an account of trials made to replace water by deliquescent salts, which trials had for their main object the doing away with the unsightly water tanks and the inconvenience resulting from an uneven spreading of water. In 1859 and 1860, M. Darcy, chief engineer in charge of promenades in Paris, experimented on the principal avenues of the Bois de Boulogne. He first used refined chloride of calcium, which was very expensive; as it could not be dissolved in water so as to be thrown from tanks, it had to be thrown by hand, in quantities of 250 grammes for each square metre; its efficiency was felt for 5 or 6 days. Later, in 1862, experiments were resumed with crude salt mixed with chloride of manganese. It was sprinkled by hand, 500 grammes to the square metre, but was efficient only three days, and if the air was not moist a light sprinkling of water was necessary. In 1864, General Inspector Homberg made some new trials. Pure and white chloride of magnesium was the salt used, and which could be completely dissolved in water. It was found that the operation had to be performed in the evening, by throwing the salts either dry and by hand or in solution in water, so as to spread 500 grammes per square metre for the metalled roads, and 400 for the pavements. For the first 24 hours the result is good, but the following day one sprinkling has to be done, two sprinklings are necessary the second day, and the effect has entirely disappeared on the third day. Sprinkling the dissolved salt with the tank costs more than salt thrown by hand. An area of 2½ acres requires 5 tons of salt, lasting only three days, costing 100 francs, and 112 with the labor, against 36 francs, the cost of *ordinary* tank sprinkling for the same area. Hence it results that the use of deliquescent salts would be very onerous. The sprinkling with water adds freshness to the air, prevents dust and opposes dryness, whilst salts, taking the little moisture left in the atmosphere, would prove far less hygienic if used, and only in case of lack of water is it allowable to use deliquescents in Paris. Street sprinkling costs the city of Paris $90,000 annually. — *Engineering News.*

The Cave at Glasgow, Ky. — It is now said that the cave, the discovery of which we mentioned a week or two ago, is far from being as remarkable as the first reports stated. The finding of any mummies is also denied.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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CONTENTS.

SUMMARY: —
The Self-congratulation of the Indiana State House Commissioners as Recorded in their Report. — Are Architects to be superseded by Draughtsmen? — The threatened Labor Troubles. — Report of the Society for the Protection of Ancient Buildings. — Opportunity for Architectural Missionary Work in Asia and Africa. — The Protection of Iron from Rust. — Concrete and its Effect on Iron. — A new Architectural Periodical.
MODERN PLUMBING. VI. 38
THE ILLUSTRATIONS: —
Entrance Lodges to Greenwood Cemetery. — Cotton Exchange, Galveston, Tex. — Hotel Cluny, Boston, Mass. — Design for a Doorway 40
THE ANTI-RESTORATION MOVEMENT 40
THE SEWAGE SYSTEM OF PARIS. I. 41
COMMUNICATION: —
Competitive Designs for Trinity Church, St. John, N. B. — The Decoration of Providence City Hall 42
THE DRAINS AND TYPHOID FEVER 43
NOTES AND CLIPPINGS 44

THE Illinois State House Commissioners, in their fourth quarterly report, congratulate themselves and the State, because in their agreement with the architect, "for the purchase of all his plans and for his services as supervising architect," they have saved twenty thousand dollars out of the maximum compensation allowed by the State; which they have accomplished by reducing his commission to two per cent, in consideration of their assistance to him in employing a superintendent. Of this agreement we have already given an account (*American Architect*, for April 27, 1878). As a matter of business it concerns only the Commissioners and Mr. May; but as an example, which if it should be used as a precedent would be a disastrous one, it concerns the whole profession. The commissioners find reason also for self-gratulation in the fact that "every possible precaution was taken during the long and tedious examination of the many excellent plans presented to arrive at a decision that would command the approval of the most careful critic." "After such thorough and careful examination, in which all the tests known to the profession were employed," it is but natural for them to trust, in spite of the "unjustifiable criticisms indulged in by some, that the State Capitol of Indiana, when completed, will be a monument of grandeur as permanent in its construction, elegant in appearance, and complete in all its appointments at a less cost than any similar building in the country;" and their confidence "has been most thoroughly confirmed by subsequent developments of a highly gratifying character." A subject for gratulation about which there can be no question is letting the excavation at nine and a half cents per cubic yard, which is less than half the architect's estimate; this part of the work is to be finished by the middle of August. At the date at which the report was made up (June 30) proposals had been invited for the 945,166 cubic feet of stone required by the architect's schedule. The Commissioners report that they have visited the principal stone quarries in their State and its neighbors, and have procured and tested sample blocks of their various stones. It is to be hoped that the results of their experiments may be made known for the benefit of other people. The public is greatly in need of trustworthy statements of the qualities of our building stones, particularly in the West. To put on record a series of intelligent and accurate tests of them would be a service as great, if not as ambitious, as supervising the Indiana capitol.

ANOTHER sentence or two may be quoted from the report, which curiously illustrate the position of the Commissioners. They have been examining buildings as well as quarries. Their examination has "developed many highly important features of interest that the Commissioners have been utilizing," and they have "obtained many useful suggestions in regard to the beauty, utility, and economical use of improvements in style of finish, as well as material to be used." The truth is that the Indiana business is quite a new experiment in public building, though something approximate to it has been tried before. It is an attempt to put not only the financial but the technical management of a great edifice into the hands of a commission of amateurs, controlling an architect whose functions are simply ministerial, — who is in fact virtually a head-draughtsman. This is analogous to the methods introduced into the English Department of Public Works by the late commissioner, Mr. Ayrton of blessed memory; the legitimate conclusion of it is, according to the tradition which he has left behind him, to discard architects altogether, and employ only draughtsmen. Inasmuch as nobody but the disappointed architects seems to have tried to disturb the Indiana commissioners, we may assume that they are doing only what the Legislature which appointed them intended they should do. But we doubt if the next generation will find reason to be grateful for their experiment.

THE general strike which was to have interrupted all the railroad commerce of the country on the 15th of June has been reappointed, as the public is carefully informed, for the 15th of August. Whatever the chance of there being any serious attempt to carry it out, the proposal is exciting a good deal of alarm in Pennsylvania, the natural headquarters of railroad laborers and miners, who are said to be united in their purpose, and to have hopes that the workmen of the large manufactories throughout the United States will join in the strike. The communists over the country naturally hail the story with delight, and their talk of plunder and division is louder than ever. It is not likely that the labor-unions are yet ripe for any such extended combination as the plan would require, or that if it were tried it could have anything more than sporadic success: but the fact that it has been so paraded shows an uncomfortable degree of confidence. Now that Kearney has left California and has come East, the newspapers make haste to say that the workingmen of the Atlantic States are too sensible to listen to the orator of the sand-lots. But on the other hand we find committees of workingmen preparing to receive him, and at a meeting held in Lynn to invite an address from him the newspapers were "denounced" for calling him a communist, while it was declared that so long as he showed himself to be acting in good faith he would be unanimously supported.

ALTHOUGH the new English Society for the Protection of Ancient Buildings, which has just published its first annual report, cannot yet furnish any great record of actual achievement, there is no doubt that it has already accomplished something of value in giving, as the report claims, a rallying point for a good deal of feeling, which has been growing stronger of late years, but for want of combination could not make itself felt. The tirades of Mr. Stevenson against architects' restorations, to which we called attention when they were delivered, though unduly impetuous, will doubtless be of service as a wholesome warning to architects, who in the zeal of an honest attempt at restoration may easily overshadow, if they do not destroy or pervert, the old work which they should maintain. Essays published by Professor Colvin and Mr. Loftie have well seconded Mr. Stevenson. One useful work which the Society has undertaken is to collect information about all the unchanged old buildings in the kingdom. It has printed a tabular blank form for the description of churches, which is to be distributed among all its members, to be filled up by whomsoever may find a church to describe, churches being the most numerous and important of old buildings. Already it has information of nearly seven hundred and fifty old churches in England and Wales which are quite unrestored. Mr. Coventry Patmore proposes that the information so collected shall be published in a pamphlet, which would be much to be desired even though it should make a volume, and supports his proposal with a subscription of fifty pounds. The report says rightly that the work to be done is heavy, and that "more cynically brutal destruction, not veiling itself under any artistic pretence, is only too common." The truth is, probably, that notwithstanding the great awakening of interest in art and archæology among students and amateurs, the great mass of people in England, as well as elsewhere, are, just as they always have been, indifferent to everything but what they are directly engaged in. The continual destruction of the London churches, which the report bewails, goes on unaffected by remonstrances. Concerning this Mr. Carlyle writes to the Society: —

I can have but little hope that any word of mine can help you in your good work of trying to save the Wren churches in the city from destruction; but my clear feeling is that it would be a sordid, any sinful, piece of barbarism to do other than religiously preserve these churches as precious heirlooms; many of them specimens of noble architecture, the like of which we have no prospect of ever being able to produce in England again.

The Society does not limit its ultimate intention, though as yet it has its active effort, to the care of buildings in its own country. Its report suggests that it may lend its hand to the defence of ancient monuments in the rest of Europe. Many people will sympathize with this aspiration who will not be surprised to learn that "the magnitude only of this undertaking has prevented the committee from taking active measures in this important matter." Missionary work of this kind is needed enough wherever civilization is old, and if an English society should find that the foreign nations of Europe are not so open as it could wish to its influence there is still a pretty ample field in British India, where a great deal of venerable architecture is going to destruction. There is in fact a still more important field, sadly in need of care, to which, if England is disposed, as she seems, to extend her protectorate over the half-civilized powers, the conservators among her people might be turned, — a field in which they have already done good service. The whole of Asia Minor and the Mediterranean shore of Africa are strewn with the remains of classic and Semitic architecture, where is material, if anywhere, out of which to build up the most important missing chapters of the history of art. It is perishing every day in the hands of Mahometan people, savagely contemptuous of whatever does not bear the seal of Islam, but whom Englishmen seem nowadays moved to instruct in the ways of modern life. "Sometimes," said the late M. Beulé, in his account of his Carthaginian explorations, "I stop before an Arab who is destroying a tomb to make lime. I tell him that those whose last resting-place he is violating were of his own race, perhaps his ancestors. He looks at me doubtfully, reflects a moment, then asks me if these fathers of his fathers knew Mahomet and the true God. When I answer no, he emits a guttural exclamation, resumes his pick-axe, and continues, with tranquil mind, his work of destruction." If missionary work is to be done, here is opportunity enough and to spare.

The most noticeable contribution to our knowledge developed in the Conference of Architects held in London in the middle of June may be found in the discussion regarding the use of iron as a building material. Professor Barff explained his system of creating upon the surface of this metal a preservative oxide. Various fire-proof inventors discoursed upon the protection of iron from destruction by fire; prominent among the preferred devices were those of our countrymen Messrs. Drake & Wight, of Chicago, for encasing iron columns with terra cotta, concrete, and other fire-proof materials, an invention which the Englishmen claimed to be very similar to what was done by Mr. Whichcord, some four years ago. Mr. Hyatt's volume on fire-resisting construction was also referred to as the most important contribution to the recent literature of the subject, although his main conclusion that fire-proof floors cannot be made if the bottom flanges of the iron beams are left exposed or are too lightly covered is said to have been "already attained by Whichcord, Hornblower, and others." Mr. Hyatt's patents for the use of timber in fire-proof construction, which are said to be essentially like those of his English contemporaries, Messrs. Evans & Swain, the systems of both parties being based upon the property possessed by solid timber of resisting fire for a long time, provided it is so disposed that the fire will attack it only on one surface and is not allowed to play around it, were also highly commended. Although American ingenuity in this department, as in all others, was not allowed to make a claim for priority of invention without an English challenge, it was evident that the activity and intelligence of Americans could not but be important elements in any advanced discussion of the subject of fire-proof building. Mr. E. M. Barry, Professor of Architecture in the Royal Academy, wound up the whole with an expression of his confidence that "iron is the material of the future."

Not a little evidence, however, was gathered together that this confident prediction is not destined to receive universal acceptance; for as regards the great tubular bridge of Robert Stephenson, it was stated by high authority that "no such structure will ever be built again," and certain engineers testified that they saw "tons upon tons" of ruinous red rust which had been shaken from its sides. It is claimed that no coating of enamel, or oxide, or concrete, or paint has been yet discovered to permanently protect iron construction from this insidious agent of decay. In all its joints and articulations, in all its bolts and rivets, wherever there is movement by contraction or expansion or vibration, wherever the smith's hammer or wrench has forced the work together, there must sooner or later be naked metal open to the invisible and motionless vapor of the air, which slowly and surely must disintegrate the structure in its most vital parts and render its ultimate dilapidation and fall only a question of measurable time. This fatal gesture of decay, it would seem, must needs vitally affect the validity of all claims for iron as the building material of the future. On the other hand, various letters have been published since the Conference, from which it would appear that in the case of the tubular bridge the accumulation of rust is to be measured rather by *inches* than *tons*, and that even now the resources of science are sufficient to protect the joints of iron structures from the adverse influence of the weather, and that constant watchfulness and frequent renewal of preservative coats in the vulnerable parts will effect the same object. It is also claimed, notwithstanding the assurance of Professor Barff that wet Portland cement or concrete will set up an oxidizing action upon the iron which is embedded in it, that as the interior platings of iron ships are coated with Portland cement, which succeeds in protecting them from the deleterious action of foul sea water, and that as a similar coating will protect iron from fire, it must, when properly applied, render any iron construction very safe indeed from any ordinary changes of temperature.

Although the pamphlet before us is the sixteenth issue of a journal that has entered on its second volume, yet it seems proper for us to speak of the *Building World* as a new periodical, for probably but few examples of it have found their way to America. Published monthly in London, this pamphlet of twenty-four crown octavo pages, illustrated by two full-page wood-cuts, has that distinctively scholarly and attractive appearance that English printers so well know how to impart to their handiwork by their choice of type and style of make-up. That the proprietors of this journal should enter it upon a field already so well cultivated by the weekly journals seems to be a most promising indication of the growth of architectural education in England. That it is intended to meet any crying want, or to cover any ground not already covered, does not appear from the one number we have seen; but seemingly it is intended to have a somewhat wider literary scope than is usually the case with technical journals, for we find the first thing here treated of to be the all-absorbing subject of the late treaty at Berlin. The other articles are, with one exception, however, either upon architectural or engineering and scientific matters.

MODERN PLUMBING. VI.

WASH-BASINS. — PANTRY SINKS. — FILTERS — BATH-TUBS.

A certain amount of taste may be exercised in choosing among the different patterns of wash-bowls and the modes of fitting up the slabs. The most agreeable apparatus in appearance is certainly the combined bowl and slab in one piece of porcelain, which is common in England but rarely seen here. Few things can be more inviting than the white basin, with the water issuing from the mouth of a small lion's head modelled in the porcelain of the basin and controlled by cocks above the slab, and the spotless slab itself, with its soap-cup and brush tray, the whole of which can be cleaned in a moment with a sponge, and will remain always free from the grease spots and stains, and the black and gaping joints, which in time overtake our marble set wash-bowls. But as they are easily broken, and not very easily replaced, although not very expensive, they are little used in this country.

With our common basins it is important that the top should be of hard, compact marble. The so-called blue-veined Italian is most used, and is very suitable, both in color and hardness. The fancy colored marbles are hard, but expensive and unsatisfactory in appearance, and the pure white statuary marbles, though beautiful, are so open in grain that they soon get stained, beyond possibility of cleansing, by grease and colored soaps. There are some American marbles which resemble the blue-veined Italian, but they are coarser and less agreeable in color.

The figure considered most desirable in the marble is an evenly distributed mottling, rather than lines or streaks. The appearance of the work is much improved by having the slab 1¼ inches thick, instead of ¾, and counter-sunk, or "dished" $\frac{1}{16}$ of an inch or more in depth, and the edge moulded to an ogee section, which gives more finish than a plain rounding and avoids the dirt-harboring angles of

more elaborate mouldings. The wall-plate or slab of one inch or ¾ of an inch marble, which is placed against the wall, should be of liberal height; fifteen inches is not too much, and its edge may also have an ogee moulding.

The stoneware basin itself is commonly streaked with a rude imitation of marble, but is often decorated with gold and colors, sometimes very richly, but rarely with much artistic success. A basin may be ornamented in some simple way for three or four dollars, or any design can be executed to order, and for the best class of houses some decoration is desirable.

For certain purposes special varieties of bowls are made, which are sometimes useful. One of the best of these is Schweikert's folding wash-basin, which, when open, displays a small bowl, hot and cold water faucets, and a little shelf for soap and brushes, all nicely enamelled and the faucets plated. The basin is emptied by turning it up, when its contents run into the small sink forming the lower part of the apparatus, which is provided with a bell-trap. The whole is of iron, white enamelled inside and painted outside, and is provided with couplings for the two supply pipes and the waste. When folded up the faucets are inclosed by the bowl, and the whole projection from the wall is only about four inches.

For use in public places and on board ship, double basins are made, which are emptied by turning the inner basin upside down, thus throwing the contents into the outer basin, from which it escapes into the waste, this mode of discharge preventing sediment from being left to accumulate, as it often does about the strainer of an ordinary bowl. Some of the Jennings bowls are made in this way, — the "tip-up" basins as they are called. But there are other kinds. One variety is supplied through the pivots on which the inner basin turns, and can be flushed while inverted, but they may have any form of supply.

For cheap work, basins and slabs can be had of any dealer in plumbers' materials, made wholly of cast-iron, enamelled, galvanized, or painted. The enamelling is now very well and thoroughly done, and such apparatus may serve a good temporary purpose; and the best ones, complete with their stand, are rather ornamental. The greatest variety of this kind of work is done by the J. L. Mott Iron Works, in New York, but most of their patterns can be had of any dealers.

The fitting up of pantry sinks is similar to that of wash-basins. The supply and waste-pipes are of similar sizes; the sink is usually covered with a marble top, and the attachment of the fittings is similar.

For a trap a 1¼ inch S-trap is very commonly used, and, if ventilated, is perhaps the best form; if unventilated, the worst. A considerable amount of grease and solid waste comes from the washing of the dishes, and interferes with the working of the valve traps, which alone, if unventilated, possess any power of resistance to gas under pressure, while the S-traps, in which the flow is rapid and unobstructed, can be depended upon to keep themselves clear; but the ventilating pipe is essential to prevent siphonage and back flow of gas. Many plumbers put in reservoir traps, Adee's, or home-made round or D-traps, to separate and collect the grease. If these are used they must be opened and cleaned at intervals, as they will not keep themselves clear as well as an S-trap, but the necessity for using them will depend upon the habits of the house in regard to the amount of grease thrown down the sink, and on the length of waste-pipe beyond the trap. If this is of small calibre and laid nearly level, whatever passes the trap will congeal before it reaches the main soil-pipe, and the only way to avoid this is to have it collected in the trap itself, where it can be reached and removed. Where ventilating pipes are used they must be connected at the very top of the bend, and should be cleared out occasionally through the trap screw opening, as they sometimes get choked by greasy scum lodging in the mouth, and when this has happened the trap begins to siphon out as if unventilated.

The pantry sink itself is made of tinned copper, generally about fourteen by twenty inches for private houses, and either round or flat-bottomed. The flat-bottomed sinks hold less water, but the dishes are not so likely to slide down the sides and come into collision, hence they are generally preferred.

The socket, plug, and chain form the cheapest arrangement for closing the waste, but the long chain with the heavy plug at the end is very apt, in careless hands, to overturn and break dishes, hence in the best class of work a "waste cock," consisting of a large brass stop-cock on the waste-pipe, worked by a long spindle and lever above the slab, is used instead of the plug and chain; or some form of valve may be employed similar to those used for wash-basins.

The supply is usually, but not always, through pantry-cocks so high as to be out of the way of the dishes. Water for drinking is usually drawn here, and for this reason, even when the other plumbing apparatus in the house is supplied from a tank in the attic, filled by a "rising main" from the street and a ball cock, as is usual in the best work, the pantry cold water should be taken directly from the rising main, not from the tank. The cold water cock is usually specified to have a screw, so that a filter can be attached in case of need.

Filters of various kinds can be procured, ready to attach to the faucet, or one can be made out of simple materials by tying a bag of flannel, with a clean sponge tightly stuffed into it, to the cold water cock, which will serve a good purpose. A neater appearance is presented by the small brass nozzles, with some filtering medium inclosed, which fit the screw of the faucet, such as the Houghton filter, made by the Walworth Manufacturing Co., of Boston, in which the water passes through coarsely powdered charcoal, or others which employ compressed sponge, sand, etc. The cost varies from twenty-five cents to two or three dollars, and the efficiency is about in proportion to the price.

Bath-tubs are made of a variety of materials. Occasionally one is seen in a lunatic asylum, or some other place where it is liable to rough usage, in form a hollowed block of stone, natural or artificial; and baths of marble or slate slabs grooved together and cemented are still used in England.

In this country metal is preferred, and iron, zinc, lead, and copper are used. Cast-iron tubs are found in old plumbing, and are still sometimes employed for the sake of strength or cheapness. The enamelled ones are much the best, but the expansion of the metal by the hot water will in time cause the enamel to scale off. If not enamelled, they must be painted, but the paint gives a slimy, disagreeable surface, and needs to be often renewed. Zinc-lined tubs are sometimes used for economy, costing only about half as much as the ordinary kind, but they are not durable. Lead linings were once common, but have been superseded by tinned copper, which is in this country the material most commonly used.

A wooden box, the length of the bath desired, is blocked up inside to the required form, and lined with the copper, which may be had of any weight, from ten to twenty-four ounces per square foot. Sixteen-ounce is the weight usually specified; if lighter than that the copper will cockle from the expansion caused by the hot water. Near the top a perforation communicates with a short overflow tube. The regular sizes for tubs are five, five and a half, and six feet long, and the price is the same for all these lengths. Any desired size can, however, be made to order. The rough boarding which forms the outside of the tub is cased over with panelling after the tub is set and connected, and a cap of wood is put on top. When thus finished the whole width is about twenty-five inches, and the height about twenty-three inches. Tubs of the French pattern, which are rounded at both ends, and an inch deeper and wider than the common kind, but only four and a half feet long, are often used where the space is limited; and any kind can be bought ready cased instead of being put in rough and cased by the joiner afterward. Where hard-wood is used for finishing around plumbing work, as is now customary, black walnut is to be preferred. Other hard-woods contain sap or albumen, which the warmth and moisture affect, but black walnut seems to be free from anything of the kind.

The modes of supply and waste adapted to baths vary according to taste. The common arrangement for supply consists of separate bib-cocks, plated or not, for hot and cold water, and special bath-bibs are made, projecting but little over the edge of the tub. They may be compression or ground cocks, or on the Fuller principle, and can be had with separate levers and a common outlet, so that the water is mixed as it flows; but this is more expensive, and may not work perfectly where the hot and cold water enter at very different pressures.

For waste, some form of valve, operated by a lever or lifting handle above the tub, is used with the more expensive fittings; but in ordinary cases a brass socket and strainer, with plug and chain, are considered sufficient. To connect the waste to the tub, instead of using a coupling attached to the socket, a circular depression is made in the copper of the bath, some three inches in diameter, and in the middle of it is cut a hole large enough to admit both the waste-pipe and the socket. The end of the waste-pipe is put through the hole, scraped bright, and flanged out; the brass strainer set in and solder poured in until the circular cavity is filled up level with the bottom of the bath, uniting lead waste-pipe, copper bath-lining, and brass socket, all firmly together.

A better method than this is to use the Scrimgeour bath plug, which screws down through the bottom of the tub into a socket below, this socket forming the end of a brass pipe connected with the lead waste-pipe. The tub can thus be disconnected from the waste without cutting any pipes.

It is often desirable to avoid the noise of the falling water, especially where the bath is situated near a bedroom. For this purpose the tub is made to fill from the bottom, and this is effected in various ways. The usual arrangement is to put in a strainer to the waste-pipe, without socket or plug, and carry the pipe a few inches horizontally under the tub, till it reaches a large brass waste-cock, or a valve of some kind. Into the short piece of pipe between the waste-cock and the strainer the hot and cold supply pipes are entered, with ground stop-cocks, having long spindles exceeding to the top of the tub, the levers being put on above the wooden capping. The lever of the waste-cock or handle of the valve is also brought out above the cap of the tub, usually between the hot and cold levers, and under each lever is a plate, engraved "Hot," "Cold," or "Waste," as the case may be. Sometimes a large four-way cock is used, with a single lever and plate on top of the bath. The plate is engraved "Hot," "Cold," "Shut," and "Waste," at different points on the circumference, and as the index on the lever is turned to the respective points the water is admitted at the bottom, hotter or colder as the index inclines to one side or the other, is shut off, or allowed to run to waste, as desired. This is a very neat arrangement, but takes up four or five inches more in length than the

common mode, which may be a disadvantage in a restricted space. Blessing's patent tubs, which are sold at the Jennings Sanitary depot in New York, are supplied in this manner, but four-way cocks of the same kind are made by Joel Hayden & Co., and probably by other manufacturers, and can be applied by any plumber.

Where the same pipe serves for a short distance both for supply and for waste, as usually arranged for bottom supply, the first water that is drawn in filling the tub is apt to bring with it a soapy scum, which remains in the waste-pipe from the last use of the tub; and many plumbers prefer to introduce the water by a separate inlet close to the bottom of the tub, with a fan to mix the hot and cold water, leaving the waste-pipe for its own work, and this can then be arranged with plug and chain, or valve, as desired. "Adee's Bath Supply" is an arrangement of this kind, using a neat plated cap over the inlet instead of a common fan of sheet copper soldered to the lining of the tub.

It is needless to say that no bath should be without an overflow, connected with the waste above the trap. The bath supply-pipes are five eighths or three quarter inch, according to the pressure, and for the waste one and one half inch is large enough, though two-inch lead or iron pipe is often used. The waste-pipe is very often connected with the trap of a neighboring water-closet, entering it below the surface of the water in it. This is not very objectionable, — at least it is better than to use a separate trap which siphons itself out, — but a good, independent trap is to be preferred. There is little sediment to be feared, so that a well-ventilated S-trap is quite sufficient. Where ventilation is impossible, a valve trap, Waring's or Bower's, will be necessary to resist back pressure of gas, and will be here under favorable conditions for working well.

Safes of sheet lead, turned up at the edges, should be put under bath-tubs in upper stories, where a leak would injure the rooms below, and the wall should be lined up with two-pound sheet lead some twelve or fifteen inches above the tub, the lower edge lapped over the edge of the tub, and the wainscoting or other woodwork put on over it, to prevent water from being splashed between the tub and the wall.

Shower-baths are arranged in many ways, for horizontal or vertical delivery, or with several horizontal jets meeting in the centre, but they are not very much used now. A diminutive form of shower known as a "Sanipoo cock," consisting of a small, plated rose attached to a rubber tube, and supplied with hot and cold water, is generally used as a substitute for the large shower, and is often fitted up over wash-basins as well as baths.

THE ILLUSTRATIONS.

LODGE AT THE EAST ENTRANCE TO GREENWOOD CEMETERY. MR. R. M. UPJOHN, ARCHITECT, NEW YORK.

The problem was simply to provide a porter's lodge, but as a balancing piece on the opposite side of the road has been put up a visitors' house. The road from the outer or street gate to the inner or cemetery gate proper is one hundred and fifty feet in a straight line, and two thirds of this distance from the outside the buildings are placed. To the right is the visitors' waiting-room, with retiring-rooms, built on the plan of a Greek cross; the main room, 17 × 17 feet, occupying one of the arms, while two smaller anterooms lead to the toilet-rooms in the most retired arm. A hexagonal outline is given to the front room by truncating the corners. The floor is tiled, and the finish and furniture are of black walnut.

The ceiling is finished in bays of black walnut showing stout beams, while about the room runs a cornice of the same.

At either of the angles of the cross-plan looking upon the road are porches in stone, with triple columns at the angle and engaged columns against the wall of the building. Above the four approaches thus created are sunken tympana, on which are represented allegorical sculptures of youth, infancy, manhood, and old age, carved by Moffat. The exterior is entirely in Belleville brown stone, cut in coursed rock face work, and about the cornice runs a bold sculptured moulding in foliage. The central point of the building is an ornamental chimney-stack, while dormers light four sleeping-rooms in the upper part for laborers or others. The main waiting-room has stained-glass windows. In the central one is a figure of St. Cecilia, the saint of sacred song and praise.

Directly across the road from this building is the keeper's lodge, a much more pretentious structure, though following the same plan. The arms of the plan measure 48 × 44 feet. In the central portion is the hall, with stairs leading from the first story, which is fourteen feet high, to the second, which is nine feet in the clear. Above this hall the building is carried up into a stout, solid-looking tower, with windows above, topped by a slated roof, the whole rising nearly sixty feet. Belleville stone is used throughout, although wooden piazzas are built in places corresponding to the stone porches of the visitors' building. The interior plan gives a main room about twenty feet square on one side of the main hall, and two rooms on the other. These last rooms have square bays, which are carried out in stone, with crocketed parapets. The carving is very finely done, though it is confined entirely to foliage and architectural carving. The finish within is of black walnut.

The gate posts are also in Belleville stone, and upon these special care has been bestowed, and their massive bulk has given opportunity for some fine sculptured work. The gates in iron wrought at the anvil are worth a special visit for study. The entire cost of the work at this entrance aggregates some $30,000.

GALVESTON COTTON EXCHANGE. MR. JOHN MOSER, ARCHITECT, GALVESTON.

The building is 67 × 125 feet. The first floor has the halls and stairways and offices for a bank, and the second floor has the Secretary's and Directors' rooms and the exchange hall. The latter measures 62 × 84 feet and is 36 feet high. The building is built of Philadelphia pressed brick relieved with Austin stone. The cornice is of galvanized iron, and artificial stone finish is used on the breasting. All the carved decorations throughout the building are designed from the *motif* of the cotton-plant; the crown ornaments of the front are a cotton bale with a crown on it, "Cotton is King." On the side of the building the main point in the cornice is accented by two shields with a bull and a bear respectively on them. The building will cost $80,000.

THE HOTEL CLUNY, BOSTON, MASS. MR. J. P. PUTNAM, ARCHITECT, BOSTON.

This apartment house, which was finished last spring, faces on the triangular space which is made one of the architectural centres of the city by the contiguity of Trinity Church, the Museum of Fine Arts, the New Old South Church, and other new buildings.

A MONUMENTAL DOORWAY DESIGNED BY MR. BERNARD VONNEGUT.

This design was prepared as a part of the regular work of the architectural class at the Massachusetts Institute of Technology at Boston.

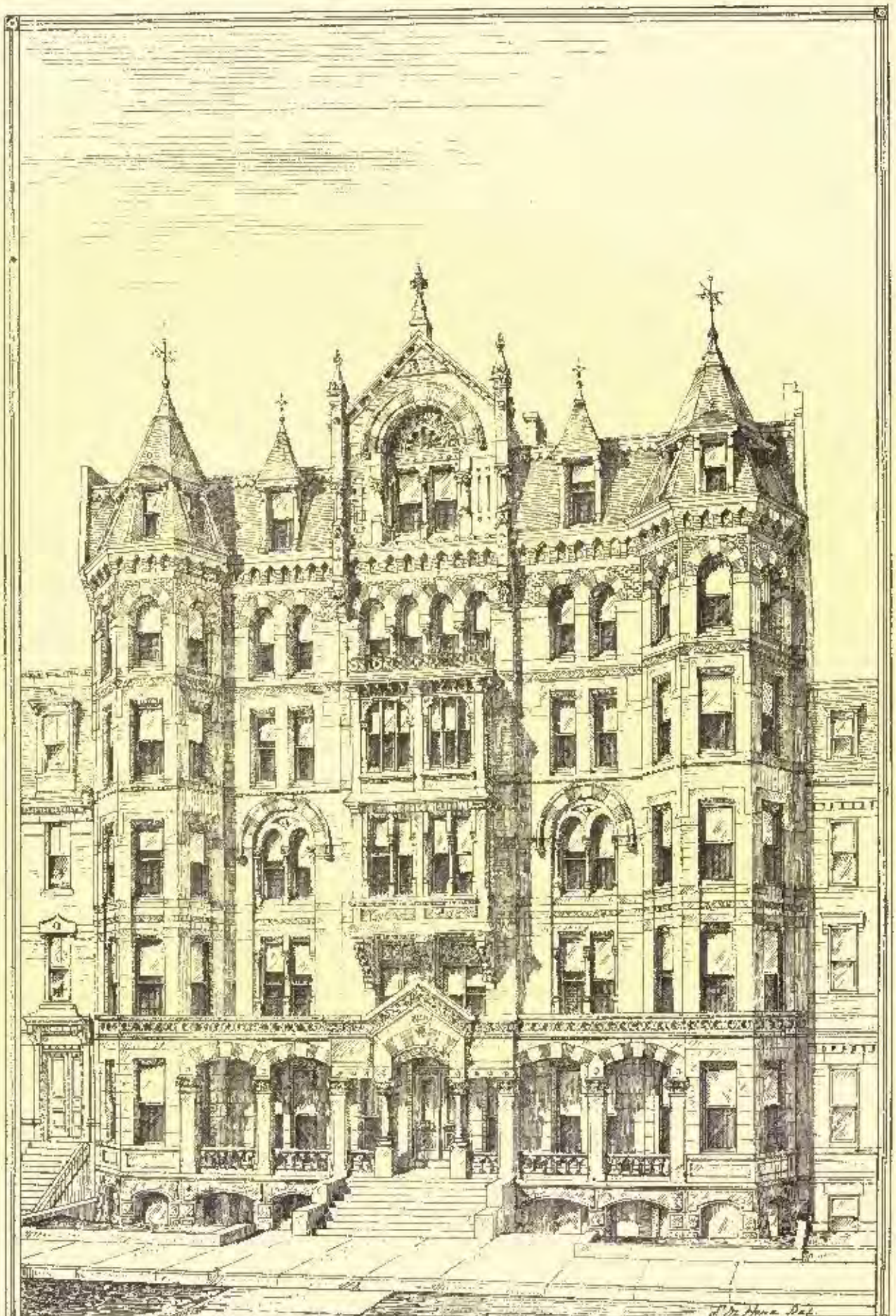
THE ANTI-RESTORATION MOVEMENT.

Baby's first birthday is always regarded with a peculiar interest; and the presentation of the first annual report of a new society, whether learned, sentimental, or social, is an occurrence of precisely corresponding importance. The infant phenomenon has by this time got beyond mere crowing and crying. It exhibits teeth. It is large for its age. It after a fashion walks — possibly talks. It is capable of being good, or naughty — certainly dear. It has developed a likeness to its mother, or its father — perchance its grandfather if the old gentleman is very much looked up to — or its great-aunt if the old lady is lasting about for a legatee. Perhaps the simplest idea connected with its first birthday is that it has succeeded in getting through one year of this world's joys and sorrows, and may therefore be expected to go on getting through an indefinite number more. So the "Society for the Protection of Ancient Buildings" has lived one year of a society's life, and commemorates the occasion by the delivery of its first Report of the Proceedings.

It is pretty well agreed on all hands that the *raison d'être* of this new association is a reality of some kind. No doubt it has its little pretences and pretentiousnesses, like all things else in our day. The time has gone by, if it ever existed, when a public movement could be sustained without a certain modicum of clap-trap. But we are accustomed to be content if the amount of this alloy be reasonably small in comparison with the weight of real metal, and it cannot be said as yet that the new society is mixed up with nonsense (to speak plainly) in any such degree as to arouse public suspicion, far less public displeasure. Accordingly, in the Report now published, although there is perhaps a little strong language to be found, there is quite as much good sense as we could have expected. In the following years there may be more.

It is not to be supposed that this particular confederation — based upon enthusiasm as its first principle — should be altogether sober-sided. Serene it may be, and even severe, but of necessity it is indignant. Anger, indeed, would not be too strong a word to signify the feeling which has given it birth and which still affords it sustenance. Not a few of its leading men may even be thought to sulk; some appear to go so far as to pant with suppressed wrath, as if, like the prophet of old, they did well to be angry with destiny. "The work to be done is heavy," says the Report; "mere cynically brutal destruction, not veiling itself under any artistic pretence, is only too common." From a fraternity of artistic intellects, impelled to the protection of artistic treasures, these words come with the true old ring of what used to be called generous rage; and not only are they entitled to public consideration, but it must be borne in mind by cooler critics that they would never receive it if they were not somewhat urgent in their earnestness.

"The Society," we are further told, "has already been much noticed by the Press, always with respect, and generally with unqualified approval." This, we think, is very fairly put, and it is to the credit of public opinion, quite as much as of the Society itself, that this is so. Ancient buildings have long, if not always, been held in instinctive esteem amongst us. Since the zealous times of the Reformation, which were quite exceptional, the common people of the country at large have regarded them — whether churches, castles, houses, or even tumble-down taverns — with filial reverence everywhere. The gentry were never of any other mind. The middle classes in the bustling towns, and their busy work-people, may have been too much occupied to think of such matters; but even they, we are inclined to suppose, have never really been quite unin-



The Hosea Quincy, Boston Mass.

J. PICKERING PUTNAM, ARCHT. BOSTON.

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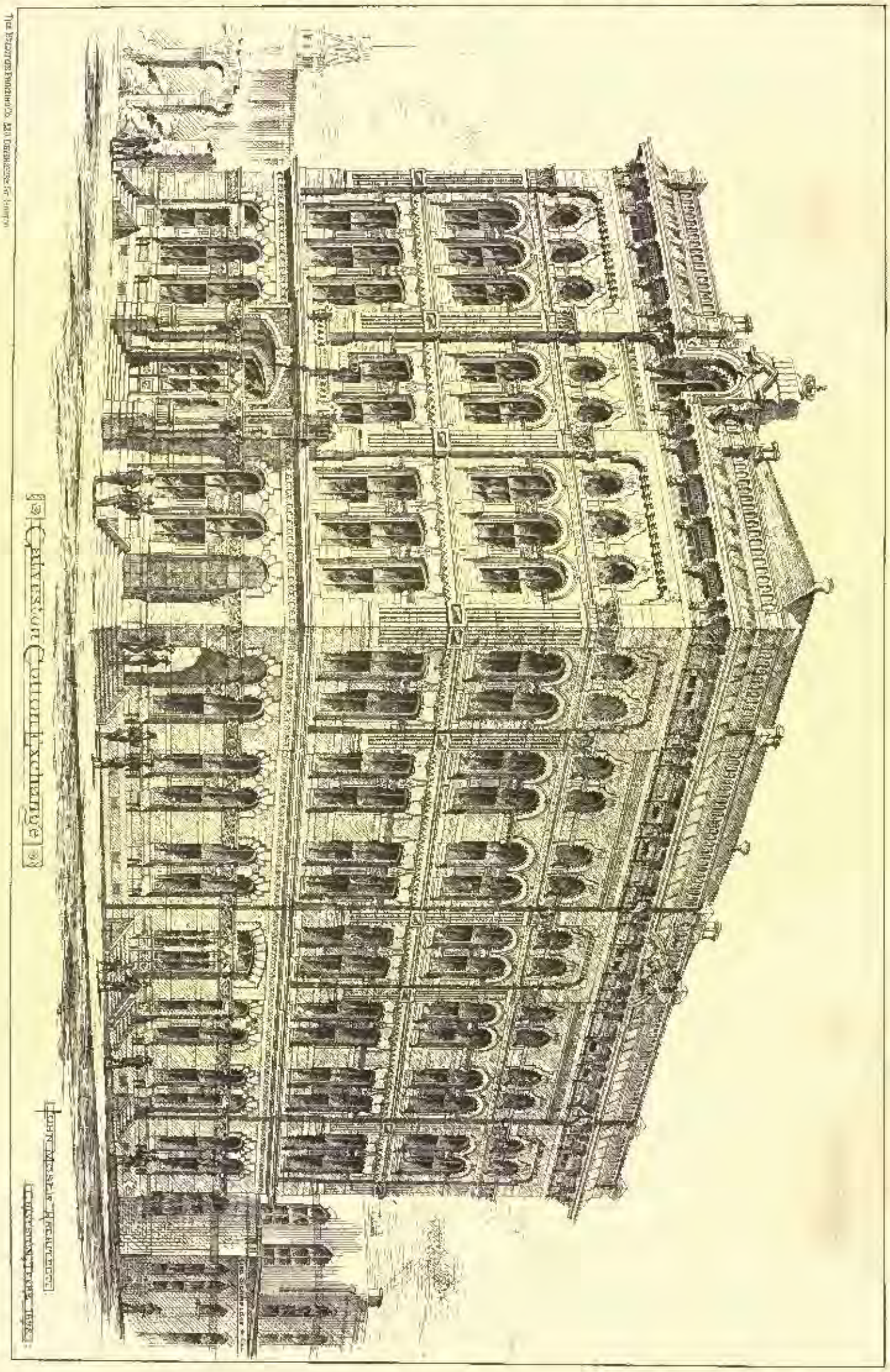
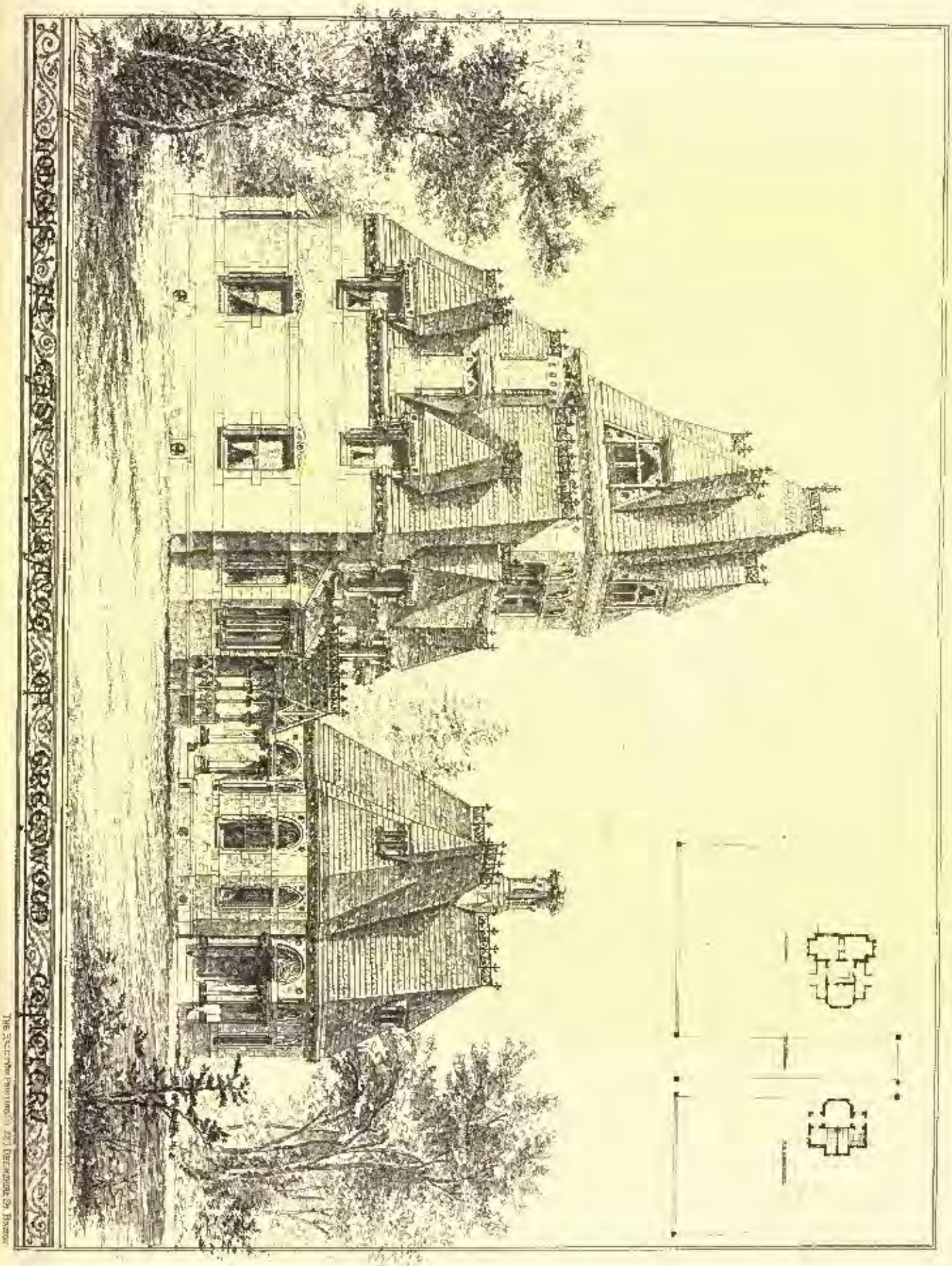
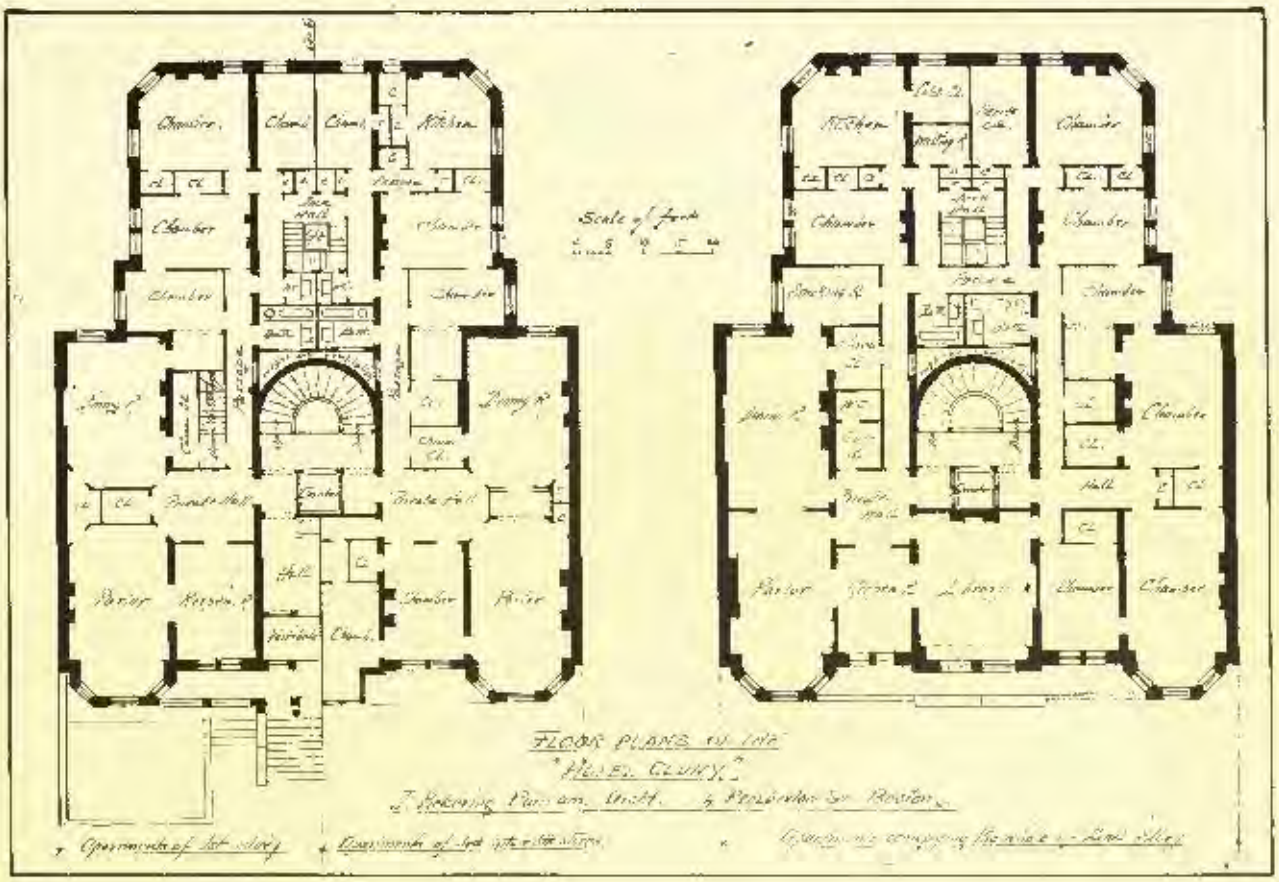
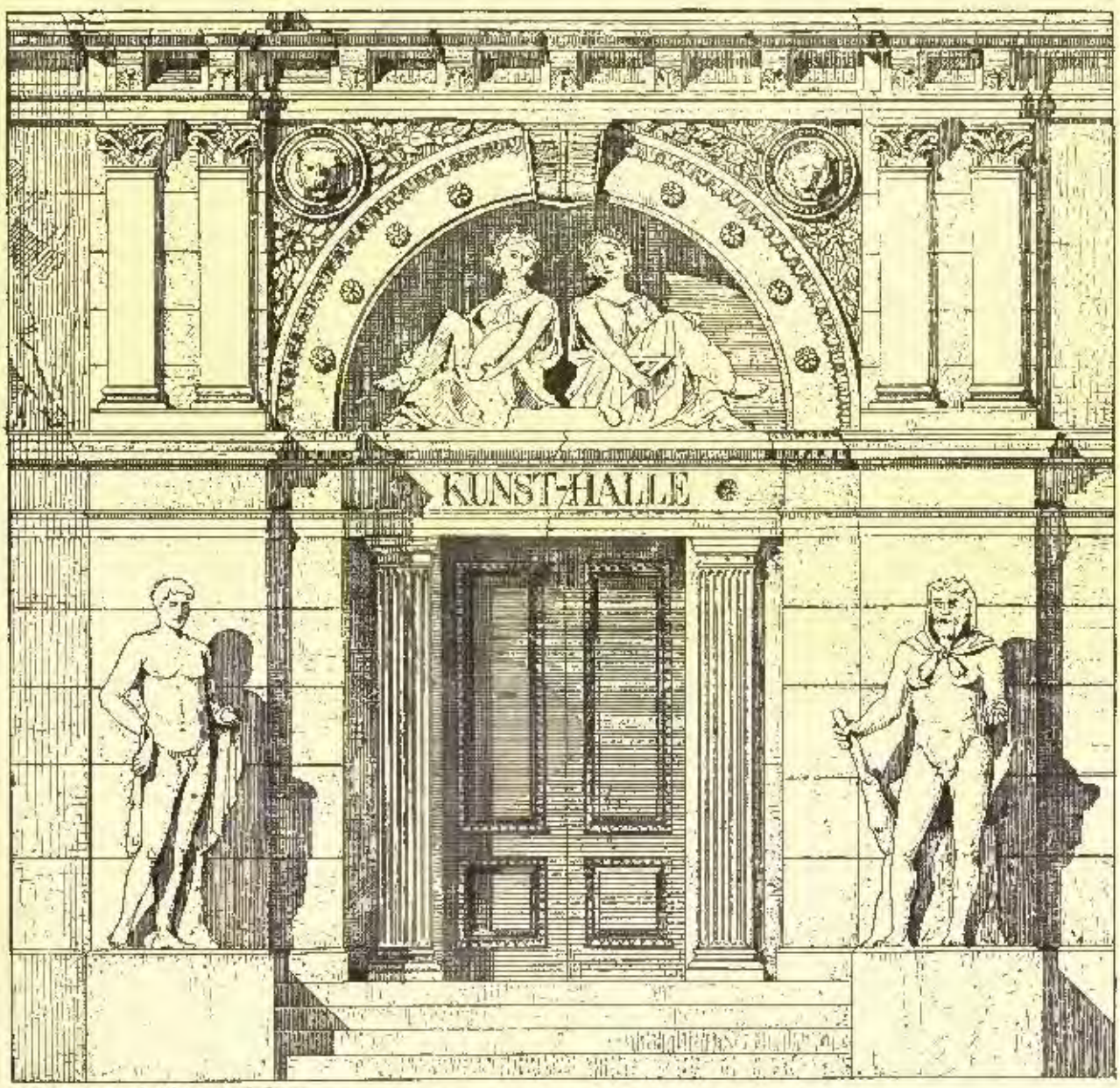

Galveston Cotton Exchange


LODGES AT EAST WINTHROP OF GREENWOOD CEMETERY





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DESIGN FOR A MONUMENTAL DOORWAY

By BERNARD VONNEGUT

pressed by the occasional sight of a ruin of the past. Who, then, are the people of whom the Society complains as the wreckers of our old and venerated monuments of building; and do they err through ignorance or of set malice? To these questions the Report, although only the first of its kind, ought to afford an answer.

The answer, as we understand it, is that the English people of the better class are apathetic. Nobody seems to be chargeable with a positive desire to destroy. The Report speaks of "mere cynically brutal destruction," it is true; but this is a figure of speech. We have not even a class of fanatical non-conformists who regard an old church with holy aversion; all that remains of a monastic grange fails to awaken in the breast of an advanced liberal one pang of combativeness; and the toppling gables and creaking timbers of a dilapidated ale-house scarcely remind the assembled topers of any more practical consideration than ghosts. But people who ought to know better are apathetic.

There are, at any rate, as many as seven hundred and forty-nine ancient churches in England and Wales which the Society has its eye upon, being happily, as yet, "quite unrestored;" and (to come to business) these are the sort of remains that the Society desires to deal with in a practical manner. Thousands of such churches have been "restored," more or less, with a vengeance; but "it is encouraging to remark that so great was the mass of fine architecture left us by our ancestors, that in spite of all the damage done by restoration and destruction there is still much left quite untouched, besides what has been left not utterly falsified." For the Society has good reason to hope that, the seven hundred and forty-nine being situated, for the most part, in six counties named, there may be discovered in at least twelve others some corresponding average of equally unsophisticated relics in England alone, leaving almost the whole of Wales, with Scotland and Ireland, to be still explored. The argument is therefore clear; the society for the protection of these ancient edifices from that destruction which is called restoration has not been set on foot a day too soon, but a good many years too late; the utmost enthusiasm which it can bring to bear upon its task will not be too much for the occasion, nor the utmost attention which it can persuade the public at large to bestow upon its work. Postponing for the moment, as beyond its reach, all action on foreign soil, and leaving comparatively unwatched those remains which are the property of private individuals, here we have a goodly number of hundreds of old churches alone, which, if the public in general, who virtually own them, do not very emphatically take into their direct custody, will be foolishly adulterated by architects and parsons, by means of a vile process of dandifying, until in effect nothing of them all will be left for the admiration of the patriotic student, or even the gratification of curiosity in the mere passer-by. Most people of intelligence will be disposed to hazard the assertion that an appeal of this kind will not be made in vain at the present day to Englishmen and indeed Englishwomen of average education. At the same time it does not follow that we can clearly see in what way the preservative or protective influence of the Society is to be actually exercised in practice.

There are two great classes of offenders against the principle for which the Society is contending, namely, ecclesiastical architects and parsons, that is to say, the working church designers and the working clergy. These persons are the positive destroyers; the only fault of their abettors is apathy, rather than direct encouragement. In other words, the general public are charged with the negative offence of standing by while the crime is committed. It is the architect and the parson who commit the crime.

It interests us of course to inquire in what way the architectural profession are receiving the Society's appeal, and it is to be feared they are not receiving it well. The commonplace English architect is not to be expected to do so. Artistically, he lives from hand to mouth, waiting upon Providence. He does not proceed very much upon first principles. He is a somewhat anxious, hard-working man, who reads very few books or even newspapers, and writes a great many letters, — partly to keep his builders going and partly to hunt up work. He cannot afford to be too particular; he professes artistic enthusiasm as matter of business, but he knows well that fastidiousness and five per cent might clash. He goes, therefore, for the most part, in a ring, like Dobbin at the mill, and it is a misadventure for him if things do not work smoothly. Of what avail is it, then, to appeal to the patriotic soul of such a practitioner? Not much.

Turning, therefore, to the average parson, let us inquire what is to be done with him. It need scarcely be remarked that, professionally, he is not a very strong man. His chief rule of life is to be "nice" — to steer a harmless course amidst the manifold temptations which provoke him to become unpopular. As regards his church, all he wants to do is to make that, also, as nice as he can, in order to please those people, the salt of the earth, who are nice like himself. He likes archæology, because it is popular with nice people. It is not to be doubted for an instant that the broad maxim of a society for the protection of imaginary ancient buildings from imaginary destruction by restoration will meet with his warmest approbation, and he will be found to make himself, as usual, exceedingly agreeable over the subject to the very nice old lady he takes in to dinner. But, by the time he has become better acquainted with the Society's actual purpose, and has listened, perhaps, to an impassioned speech delivered by some one of its principal enthusiasts to a gaping audience of his villagers, he probably comes to doubt the niceness of a doctrine which requires so much heat for its development, and will hesitate very considerably before he commits himself openly to the abandonment of a long-cherished purpose to restore his church, simply because a new-fangled notion has sprung up for the preservation of ruin at the expense of both that comfort and that sightliness which are so dear to all the nice people he knows.

It is said, however, that the new Society has certainly begun to make its influence felt, and that, in fact, there are cases to be quoted in which destructive restoration has been averted through judicious representations. This of course is practical business, and nothing else is so. But the Report may well say "the work to be done is heavy," for the work in reality is nothing less than to keep a watch over the whole of England, so as to anticipate disaster before it has taken the actual form and substance of a nice restoration and an architect's fee. To attack the enterprise after it is matured will always be most ungracious. Even when successful — as it frequently may be — it must give rise to popular commotion, which will be regarded as a cure that is worse than the disease; and if popular architects, and still more popular clergymen, are to be driven to the alternative of either defending their schemes of restoration or submitting to be snubbed and even vilified, the work of the Society will be indeed heavy. Nevertheless, we wish it success heartily, and will only add that it will do well to perform its function discreetly. To put an entire stop to destructive restoration by intellectual violence may be impossible, but to secure an equivalent result in a great measure by ceaseless persuasion of the public mind is what may be accomplished, perhaps, more effectually and more quickly than is expected. — *The Architect.*

THE SEWAGE SYSTEM OF PARIS. — I.

THE area enclosed within the fortifications of the city may be put down at 19,000 acres. The quantity of water distributed for miscellaneous service over this area per day is about 40,000,000 gallons, and the average daily rainfall is some 22,000,000 gallons. About twenty per cent of this quantity is absorbed by evaporation, leaving 54,400,000 gallons to be dealt with. This water is loaded with the *débris* from the streets, and the impurities from manufactures, house refuse, stables, etc. The sewage, properly so called, does not enter the sewers, as it is dealt with separately. Roughly speaking, there are about 100,000 water-closets in Paris, of which a small proportion is provided with separators that retain the solid excreta, while permitting the liquid portions to pass into the sewers; the remainder are chiefly emptied into cesspools. The present system is of very recent date, but partial drainage works for conveying the sewage into the Seine were constructed at a very early period. In 1831 the remains of sewers dating from the time of Philippe le Bel were found underneath the Palais de Justice; but the conduits then formed were only for the service of a few palaces or other important buildings. In early times the city discharged its sewage into the Seine, the university quarter on the left bank into the Bièvre, and the town, properly so called, into the Ménilmontant brook. As for the neighboring slopes of Charonne, Ménilmontant, Belleville, and Montmartre, the porous surface soil absorbed a large proportion of the sewage, which — partially filtered — found its way into the Seine. The brook of Ménilmontant was through several centuries known as the main sewer of Paris, and many roughly constructed channels were made from time to time to converge into it. About 1550, under the reign of Henri II., a very important effort was made to improve the condition of the city. A scheme was prepared by an engineer of the period, Gilles Dufroissis, to divert the water of the Seine into the sewers and channels, natural and artificial, and by means of sluices to create a constant current of water, which should carry away all obnoxious matter down to a suitable point of discharge. This project, however, was opposed by the city, and nothing came of it. In 1605, under Henri IV., Prévôt François Miron arched over at his own cost the Ponceau sewer, which extended from the Rue St. Denis to the Porte St. Martin. In 1611, Hugues Cosnier, director-in-chief of the Loire Canal, revived the project of Dufroissis, but failed; in 1631, engineer Pierre Pilon was charged with the work of enlarging the city by enclosing within the *enceinte* of the Tuileries the Faubourg St. Honoré as far as the Rue Royale, and the Faubourg Montmartre as far as the present boulevards. In the course of this work he made the sewers navigable from the Arsenal to the Porte de la Conférence, and constructed near the walls of the city a large sewer twelve feet in width. At this time there were about 12,000 yards of sewers of all kinds in and around Paris, the greater portion in so bad a condition that many workmen employed in repairing them were killed. It may be worth noticing that the physicians of the period, on inquiring into the cause of these deaths, so far from recognizing the real reason, reported that the men in question were killed by the stare of a basilisk which they asserted inhabited the sewers. In 1667 the service of police was created, and shortly after a municipal ordinance enjoined an annual inspection of the sewers by the various prévôts, who were to take steps for their maintenance. But in spite of this, matters went from bad to worse, the sewers became choked and absolutely useless, even to convey the sewage into the Seine, where it had so long been a grievance to the water-side population; and on the 24th of April, 1691, a decree was issued for the formation of a commission to study

the whole subject and devise a remedy. In a map of Paris dated 1393, the brook of Ménilmontant as it then existed is shown. The banks were sloped and planted with trees, and its principal tributaries were the sewer from the Rue des Egouts, between Rue St. Martin and Rue St. Denis, the Montmartre sewer, and the Gaillon sewer, which afterwards was converted into the Rue de la Chaussée-d'Antin. The land in its vicinity was deserted, for no houses could be occupied near it. But it was not till about 1730 that extensive operations were undertaken to ameliorate the condition of the city. Michel-Etienne Turgot, father of the great minister, engaged seriously in the work; he constructed an open channel in stonework, and provided means for its easy cleansing, and he formed also a reservoir at the end of this canal to receive the contents of the Belleville sewers, which then flowed through the canal. A map, dated 1765, shows the extent of the works carried out by Turgot. The canal followed the Rue des Fossés-du-Temple, where for part of its length it was arched over, but was left open between the Porte du Temple and the Porte St. Martin to receive the Sewer du Temple and the Sewer de la Croix; it then passed through the faubourgs of St. Martin, St. Denis, Montmartre, and Poissonière, and was there partially covered over and planted with trees. It was left open again to receive the sewer of the Rue St. Lazare, and passing beneath Rue de la Chaussée-d'Antin, it penetrated through the Faubourg St. Honoré, and the middle of the Champs Elysées, to fall into the Seine. Gradually the work of extending and improving the sewers was carried on, and in 1806 there existed about 79,700 feet covered, with the exception of 5,200 feet. During the reign of Louis Philippe about 80,000 yards of additional sewers were made; but their usefulness was only partial, and the sanitary condition of the streets was bad in the extreme.

In 1855 the works which were to transform the whole system of sewage collection were commenced, the projects having been previously elaborated by the late M. Belgrand, Ingénieur des Ponts et Chaussées. At that time there were about 115,000 yards of sewers for 423,000 yards of streets, while at present there exist some 775,000 yards of sewers for 869,000 yards of streets. About 148,000 yards is the length of the service drains of the dwelling-houses. The system as now carried out is divided into two classes, the sewers and the collectors; the former receive the street and house water, and conduct it to the collectors. The latter are constructed along the lower levels of the city to receive the natural drainage, as well as the contents of the sewers. They are three in number. The first is on the right bank of the Seine, and is known as the Departmental collector; it commences at the point of intersection between the Rue Oberkampf and the Rue Ménilmontant, and passes under the old boulevards. Its course is broken by three bends, by which it crosses the basin of La Villette, the fortifications, and the Grande Route St. Denis, until it falls into the Seine near the Ile St. Ouen. The sewage dealt with by this collector is of the worst kind, containing as it does the impurities from the abattoirs, the gas works, the factories of La Villette, Montmartre, etc., and even the overflow from the Bondy *réservoir*. The second collector on the right bank of the river commences at the Arsenal basin, following the quays, and running under the Rue Royale, the Boulevard, and Rue Malesherbes, it traverses the Route d'Asnières and falls into the Seine above the railway bridge. At the Place du Châtelet it is increased to receive the contents of the collector of the Boulevard Sébastopol; at the Place de la Concorde the sewer of the Rue de Rivoli joins it; at the Place de la Madelaine it absorbs the sewer of the Petits-Champs, and at the junction of the Boulevard Malesherbes and the Rue de la Pépinière, a sewer following the course of the brook of Ménilmontant flows into it. On the left bank there is only one collector, which at its commencement absorbs the river Bièvre, that at one time used to flow into the Seine above the Pont d'Austerlitz. The collector taking this stream runs behind the Jardin des Plantes, towards the Boulevard St. Michel, when it passes along the quays as far as the Pont d'Alma; here a double siphon takes it across the river, when the gallery passing under the height of Chaillot and the Avenue Wagram, crosses the village of Levallois-Perret, and joins the collector on the right bank last described, about 550 yards from the point of discharge. Near the Pont d'Alma on the left bank, it receives the Montparnasse sewer, and the Grenelle collector; on the right bank the Auteuil collector falls into it.

As an indication of the form and arrangement of the galleries, we may give a few particulars of the great collector on the right bank, the course of which has been already indicated. The section is a gradually increasing one to accommodate the discharge from the various tributaries flowing into it. The sewage water flows in a channel, on each side of which is a paved sidewalk, the whole being enclosed within a semicircular arch. The collector is composed of four different types, Nos. 6, 5, 3, and 1. The total length is 27,207 feet, and the lengths of the different sections are respectively 2,295 feet, 2,833 feet, 7,019 feet, and 15,059 feet. Type No. 6 extends from the canal St. Martin to the Rue St. Paul; type No. 5 from that point to the Boulevard Sébastopol; type No. 3 from the Boulevard Sébastopol to the Place de la Concorde; and type No. 1 from this point to the discharge at Asnières. Type No. 6 is 8 feet 2⅝ inches wide at the point of springing of the arch, the height from the side galleries to the point of springing is 4 feet 11½ inches, and the side walls are curved with a radius of 18 feet 9⅛ inches; the width of the side galleries is 35⅜ inches on one side, and 15⅝ inches on the other, and the width of the channel is 31½ inches. The depth of the channel in the middle is 15⅝ inches, the invert being curved. The thickness of masonry is 10⅝ inches inside the invert, the bottom of the structure being flat, 7 feet 6½ inches wide. The thickness of the side walls and arch is 13 inches, and the interior of the sewer is covered throughout with a lining of cement 1 5/16 inches thick. The outside of the arch is also protected with cement. Type No. 5 is 9 feet 10 7/16 inches wide at the springing of the arch, the height of the side walls to springing is 4 feet 11½ inches, and the radius to which they are curved is 12 feet 9½ inches. The widths of the sidewalks are 27 5/16 inches and 19½ inches respectively, and that of the channel is 47½ inches. The depth of the latter is 31½ inches in the centre and 27 5/16 inches at the sides; the thickness of walls and arch is 13 inches, and the thickness underneath channel is 11 13/16 inches. The underside of the structure is flat and about 6 feet wide; this, like all the other sections, is lined throughout with cement. Type No. 3 is 13 feet 1 3/16 inches wide at springing; the height from sidewalks to springing is 35 7/16 inches, and the side walls are curved with the same radius as the arch, so that the section of this type is more than a semicircle. The sidewalks are both 27 5/16 inches wide, and the channel is 7 feet 2½ inches wide. The depth of the latter is 39⅜ inches in the middle and 31½ inches at the sides, the thickness of masonry under the channel is 17½ inches and at the sides it is 23⅝ inches. The under side of this section is curved on the exterior. Type No. 1 is 18 feet 4 inches wide at springing, and 23 feet 7 inches wide on the outside of the masonry, the arch is elliptical and the height from springing to centre is 6 feet 4 inches; the side walls are curved and are 3 feet 5 inches high from the sidewalks to the point of springing. The walks themselves are 2 feet 11½ inches wide, and the width of the channel is 11 feet 5 inches. The depth of the latter is 6 feet 11 inches. — *Engineering.*

THE COMPETITIVE DESIGNS FOR TRINITY CHURCH, ST. JOHN, N. B.

St. John, N. B.

The readers of the *American Architect* are aware that, as the result of a close competition, Messrs. Potter and Robertson, of New York, were appointed architects for the new Trinity Church. The work was advertised for tenders, and the excavations for the foundations were begun, but for some reason or other (report has it on account of the tenders received being considerably higher than the estimates of the architects) the work has been taken out of their hands. Some time ago circulars were received by several architects in town, inviting them to send in drawings in competition; and in reply to this, notwithstanding there was no inducement held out in the form of premiums, ten sets of drawings have been received, all representing a certain amount of labor and time, if not thought, in their preparation. If we fix the moderate sum of one hundred dollars as the value of each, the whole would represent one thousand dollars worth of work. It is humiliating to the architectural fraternity, that in order to get work they have often to give so much for nothing; but competition here is somewhat keen, and the profession is not held in the highest respect.

With few exceptions the designs exhibited are of a very mediocre description. As a general rule the architects on this side of the Atlantic fail to get the true spirit and feeling of English Gothic in any work of this kind they attempt. The lack of study and the absence of examples of old work in a great measure account for it. There is a constant tendency to run off into vagaries and inventions that are hideous.

For instance, in the set of drawings marked No. 2 there is some tracery of the most fantastic form; it is original, but no improvement upon anything seen in old work. The roof in this design is formed in very rigid lines, which would not look well in execution. Much labor has been bestowed on the plan, even to indicating the position of the gas fixtures. One good feature it certainly has: the wooden posts, in the position where nave columns or piers would come, are placed close to the side walls of the church, and form no obstruction to sight.

In No. 9 we have a carefully drawn design in a late period of Gothic, perhaps too elaborate. The height from the ground line to the apex of the spire is 250 feet, by scale; and how such a church and spire can be built for the money appropriated is past all comprehension.

No. 4 exhibits a very weak-looking design. It does not err like No. 9 in being too costly, for the windows are devoid of tracery, being simply oblong openings with pointed arches pierced through the wall. The tower and spire are badly proportioned.

Design No. 10 is represented by highly colored drawings. Though the proportions are somewhat good the style is not very pure. In the tower and west end there are some openings 20 feet long and 6 inches wide.

No. 8 is on the whole superior to the other designs; the proportions are good, and there is a better conception of what Gothic art is. Some of the detail has not been studied; the buttresses to the tower look thin, and the clock has the appearance of an adjunct to the design.

The design marked No. 1 is the only one represented by elevations finished in pencil, and does not attract much attention. It is

in the Early English style, and shows a thorough acquaintance with Gothic work. The school and lecture room are particularly well designed, but it is probable that this design is not florid enough for the public taste.

It will be somewhat curious to watch the result of this competition. So far, no sign of calling in professional assistance has been shown. Will the building committee consider themselves the best judges, or will the work be given to the competitor who can bring the most influence to bear on the committee, irrespective of artistic merit in his design? R. B.

THE DECORATION OF THE PROVIDENCE CITY HALL.

Boston.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir, — There has recently been held in our neighborhood an unusual and extremely interesting competition, namely, that for the interior decoration of the Providence City Hall.

Having had the pleasure of seeing some of the drawings offered, I can say that they were of a high order of merit. The fact of the competition having been entered into by Messrs. McPherson, La Farge, Rimm, Frank Hill Smith, and others, is a sufficient guarantee of the varied character and treatment of the subject.

Now, sir, as such an opportunity seldom occurs, and as the competitors would doubtless be willing to loan their sets of drawings, why could they not be hung for a few days in, say the gallery of the Art Club, for inspection? I am aware that it is now the "dead season," but before the autumn the drawings may have become scattered, interest lost, and the matter forgotten. Can we not see them *now*? W. G. P.

THE DRAINS AND TYPHOID FEVER.[1]

THERE is no longer any dispute concerning the chief vehicles by which the specific contagium of typhoid fever is conveyed. These are the air that we breathe and the liquids that we drink. Perhaps we may narrow the question still more, and ascribe to the action of the air only the indirect conveyance of the contagium to the stomach; for there are indications that as the contagium of typhoid fever proceeds from disorders of the alimentary canal, so it is only the surfaces of the alimentary canal which are susceptible to its attack.

The poison of the air may be direct or indirect. That is, it may be due to the exhalations of decomposing matters in dung-heaps, pig-sties, privy vaults, cellars, cesspools, drains, and sewers; or it may be due (according to Pettenkofer) to the development of the poison deep in the ground, and its escape in an active condition in ground exhalations. The water, milk, etc., which we drink may be contaminated by the absorption of foul odors from air with which they are in contact, or by the direct admixture of organic matters bearing the elements of infection. There is such a multitude of possible sources and channels by which the infection may be brought to us that it is often almost impossible, in first cases, to determine which has been actually in operation; but the original case being established, it becomes comparatively easy to trace the channel of its influence in the production of further cases.

All the learning of the ages has taught us no better formula to express a perfect sanitary environment than the old one of Hippocrates: "Pure air, pure water, and a pure soil."

If we would turn typhoid from our doors, and literally stamp it out as an epidemic, we need only to insure this condition in its integrity. We may still import single cases from less cleanly neighborhoods, but it will be our fault if we permit it to attack even one of our own community.

I have previously cited the case of the outbreak at Over Darwen, in England, as follows: —

"There has recently been an investigation into the origin of an outbreak of 'filth fever' in Over Darwen, England, the origin of which for a long time eluded the careful search of the authorities. It was finally worked out by a sanitary officer sent from London. The first case was an imported one, occurring in a house at a considerable distance from the town. The patient had contracted the disease, came home, and died with it. On first inquiry it was stated that the town derived its water supply from a distance, and that the water was brought by covered channels, and could not possibly have been polluted by the excreta from this case. Further examination showed that the drain of the closet into which the excreta of this patient were passed emptied itself through channels used for the irrigation of a neighboring field. The water-main of the town passed through this field, and, although special precautions had been taken to prevent any infiltration of sewage into the main, it was found that the concrete had sprung a leak and allowed the contents of the drain to be sucked freely into the water-pipe. The poison was regularly thrown down the drain, and as regularly passed into the water-main of the town. This outbreak had a ferocity that attracted universal attention; within a very short period two thousand and thirty-five people were attacked, and one hundred and four died."

Liebermeister says that typhoid dejections, conveyed in night-soil spread as manure upon the gathering ground of an aqueduct, so contaminated the water supply as to produce an epidemic of typhoid fever among the population using the water. Similar instances might be cited almost without number. Indeed, there is among investigators no difference of opinion as to the communication of the disease by means of drinking-water thus polluted. There are many instances recorded of the contamination of the water of wells by the transmission of fæcal matters through the soil from adjacent privy vaults and cesspools.

Not only does the infection follow the course of water to which it has gained access, or find its means of dissemination in the exhalations of decomposing filth, and thus contaminate the air which we breathe, but these exhalations are readily absorbed by water, which is capable of holding the poison, to the detriment of those who may drink it, and of transmitting it again to air with which it may be in contact. Many cases have been reported similar to that cited by Dr. Carpenter, health officer of Croydon, who traced the origin of an outbreak to the drinking of water from a house cistern, to which air from the public sewer had been led by the pipe serving as an overflow for the cistern.

Especial danger attaches to the use of water-traps, or water held in the bends of waste-pipes, soil-pipes, etc., when these are the only barrier between the interior of the house and a sewer or cesspool containing typhoid dejections. The retained water absorbs the poison as its outer or sewer end, becomes saturated with it, and gives it off to the air in the house end of the pipe.

There is reason to suppose — reason almost sufficient to secure reliability — that the poisonous element is developed and made effective only when the decomposition of the fæces containing it takes place in the absence of a supply of fresh air sufficient to carry it on in the most rapid and healthy way. In other words, active oxidation, whether produced by oxidizing disinfectants, by the operation of atmospheric oxygen, or by the intensified oxidizing power of the contained gases of porous material, seems to prevent decomposing fæces from assuming a condition favorable to the development of infection. The evidence in support of this theory is of course of a negative character, but it is extensive, and, so far as the writer knows, it is accepted by leading physiologists.

Typhoid fever is not produced by exhalations from the surface of lands irrigated with the discharge of such sewers as have a rapid and continuous flow, and thereby deliver all they receive before it has had time to undergo decomposition. There is no evidence that typhoid fever is caused by the contained air of thoroughly ventilated soil-pipes. The most active professional enemies of the earth-closet system have never adduced an instance where typhoid fever, or any other cognate disease, has followed its well-regulated use. In *The Lancet* of March 6, 1869, Professor Rolleston, setting forth his objections to the earth closet, said: "If I am told that the earth closet is inoffensive, and that the privy is fetid, I answer that a rattlesnake is none the less dangerous because its rattle is removed; and that, for anything shown or known to the contrary, odor is to infection, deodorization to disinfection, what the noise of the serpent is to its bite." It is nine years since this was written, and amid all the voluminous reports upon the dry-earth system there is no word to sustain Dr. Rolleston's fears. On the other hand, together with much else of similar purport, the evidence of Dr Mouat reports that in those jails of India where the earth system is used even at the time of the most serious cholera epidemics, this disease, which is so like typhoid in its mode of transmission, never gains a foothold. One would almost be justified in replying to Professor Rolleston that it is not a question of removing the rattle, but of killing the snake. Investigations made to determine the manurial value of closet earth used many times over indicate a total and absolute destruction, not only of the odor but of the whole combustible material of the added fæces. The result has shown as complete destruction as would attend burning in a furnace.

The physician in considering the treatment of the material in question has one of two sets of conditions to deal with. The fæcal wastes of the household which he is attending are either removed by water-carriage, or thrown into privy vaults. If by water-carriage, they are delivered into a public sewer or into a cesspool. Sewers, as they usually exist, and cesspools always and invariably, are so circumstanced as to favor the thorough development and multiplication of the morbific material under consideration. Unfortunately, sewers and cesspools are so connected with the interiors of houses, with others as well as with that where the disease originated, as to make them too often the means for converting a sporadic case into a centre of infection. Even the house drains and soil-pipes through which the excrement passes on its way to the cesspool or sewer are very generally as bad as these final receptacles themselves.

Where water barriers are supplemented with one of the many mechanical check valves recently introduced, this means for the return of the infection is shut off. Where the soil-pipe and drain are freely open at both ends for the transmission of a current of atmospheric air, the danger of the development of the poison is greatly reduced, if not entirely removed. But even here, although we may feel secure so far as the immediate household in question is concerned, it is to be remembered that, at least in the case of a public sewer and of a cesspool common to several houses, the matter deposited may produce its injurious effect in other families which are less well protected against it. Even where the cesspool is con-

[1] From a Paper on "The Causation of Typhoid Fever," by G. E. Waring, Jr., C. E., published in the *Boston Medical and Surgical Journal*, to which was awarded the prize of the Rhode Island Medical Society.

nected with one house only, to permit the specific poison of typhoid fever to enter it and to spread itself through its accumulated filth is to incur a danger akin to that of establishing a gunpowder vault in one's back yard.

It may be advisable to refer briefly to the manner in which, and the degree to which, the general health is influenced by exhalations from decomposing organic matters in sewers, house-drains, vaults, cesspools, and cellars. It must have been the frequent experience of all physicians that every question as to the tainting of the air of a house from these sources is met by the assertion that no bad smell has ever been perceived. In the first place, the accustomed nostril is dull to detect a constant odor, and in the next it is hard to make people believe that where they can smell no offence there still may be danger. We ourselves know that the juices of the cadaver are most fatally dangerous before offensive decomposition has set in. Those who have given attention to the influence of drain-air in causing disease know very well that the action of this upon the health bears no relation to the intensity of its accompanying odors.

The only safety is to be sought in the absolute freedom of the air that is breathed and of the water that is drunk from every species of contamination due either directly or indirectly to organic decomposition. A little rift in the waste-pipe of a wash-basin, so slight as to be detected only by the application of tissue-paper, has kept a whole family miserable and complaining, and susceptible to every species of contagion, for years together. Decaying vegetables in a cellar, and decaying filth in the waste-pipe of a kitchen sink, may be regarded as the bane of the existence of half the women in America. Those more serious defects which come of ignorantly arranged plumbing work — by no means of good plumbing work, which is the sanitarian's best aid — are responsible not only for most of the zymotic diseases appearing in the better class of houses, but in like degree for the generally ailing condition of so many of those who pass most of their days and nights in these houses.

The fundamental principle should always be borne in mind that neither in a sewer, nor in a cesspool, nor in a house-drain, nor in a soil-pipe, nor in the smallest waste-pipe should decomposition be allowed to proceed without such an abundant presence of fresh air as will secure its most rapid and complete progress. The same condition of obstructed decomposition which fosters the development of infecting agencies is precisely that which leads to a generally unwholesome and debilitating atmosphere. All investigation of this subject, and all discussion of the *modus operandi* by which unwholesome influences lead to the spread of epidemic diseases and to the lowering of the general health, bring us at the end to a firm belief in the principle covered by Hippocrates's prescription: pure air, pure water, and a pure soil.

NOTES AND CLIPPINGS.

The "Blue" Copying Process. — Some time ago we were shown by Mr. P. Barnes (who afterwards read a paper on the subject before the American Institute of Mining Engineers) a process of duplicating drawings, which architects may find of great use in those cases where it is necessary to supply several contractors with copies of the same drawing. The process is essentially a photographic process, in which an ordinary tracing on tracing-cloth takes the place of the negative, and the result is shown in white lines on a background of deep Prussian blue. The process is so simple that the prints may be easily made by almost any office-boy. It also saves one step in the ordinary process of making drawings, for the inked tracing may be made over the first pencil drawing on paper, and so obviate the necessity of inking-in the original drawing. The only apparatus needed are a drawing-board, a piece of clear plate glass, say three eighths of an inch thick, of the same size, and a piece of felt or blanket. The paper on which is to be printed the copy may be of any kind that will endure a thorough wetting at the time when it is prepared with the sensitizing solution. This solution is made by dissolving in separate vessels 1½ oz. of citrate of iron in 8 oz. of clean water, and 1½ oz. of red prussiate of potash in a similar quantity of clean water. When dissolved, the two solutions are mixed, and must be kept protected from the light, if possible in a yellow glass bottle. To prepare the paper, wet it thoroughly on one side with the solution, applying the first coat with a full wet sponge, and the second with a sponge almost dry. The paper should then be laid away in a dark drawer to dry. When dry it is of a good yellow or bronze color. To make the copy, the sensitized paper is placed upon the board with one or two thicknesses of blanket under it. Over it is laid the tracing which is to be reproduced, and this in turn is covered by the glass plate, which may be brought to an even bearing by joiners' screws if necessary. To print the copy it is only necessary to expose the apparatus to the light, for half or three quarters of an hour if clear sunlight is to be had, or if the day is cloudy the exposure must continue for an hour and a half. When the glass is removed the body of the paper will be found to have changed its color to a deeper bronze, while the lines of the tracing are found to be darker still. As soon as the glass is removed the copy should be thoroughly washed for a minute or two in clean water, the effect of which is to turn the background blue, leaving the lines in white. If the copy needs any correcting touches, these may be added by using a solution of the carbonates of soda or potash applied with a brush or pen. The process is of French origin.

Political Caricature in Architecture. — It is said that the stone-masons have amused themselves with cutting on some of the new work of the Cathedral of Cologne a grotesque figure representing Hoedel, the would-be assassin of the Emperor William. The caricature has the body of an animal, in one of whose fore paws is grasped a revolver, while the other flaunts a newspaper.

Fire-Proof Doors. — The incombustibility of wood, in itself a poor conductor of heat, under certain circumstances is the basis of several methods of fire-proof building, as for instance in those doors which are built of joists closely bolted together, so that there can be no circulation of air, and consequently no draught for fire between them. There are other modes of using it which show that when properly protected wood is one of the most fire-resisting of materials. Perhaps the best example of this property is found in cotton-mills, where wood is often used in making the doors which separate the picker-rooms, which are particularly likely to take fire, from the rest of the mill. These doors, built of solid plank, are with their jambs simply covered with sheet tin, and, as the following letters show, are much better able to resist fire than iron doors in the same situation. The action of the fire may slowly carbonize the wood and convert it to charcoal, a poorer conductor even than wood; but as the warping or shrinking of the tin is not enough to affect the form of the door, it maintains its shape and effectually excludes the flame. The letters mentioned form part of a circular issued by the Manufacturers' Mutual Fire Insurance Company, of Boston: —

"Boston, April 9, 1878. The undersigned has usually visited the scene of all fires reported to this office, in which we are interested as underwriters, whether the damage were much or little; and one principal object of the visit was to study the fire as to cause, progress, and results, and I may say that I have never yet seen a well-made wooden tinned door which gave to the fire; and I have no recollection of any case in which an iron door of ordinary construction, subjected to a heavy fire, has proved reliable. Among the many picker fires which have happened in mills insured by this company since 1852, only one has proved destructive to the mill, and the door in this case, dividing the picking-room from the mill, was of iron, and did not hold the fire at all, but immediately softened and warped out of shape, allowing the fire free passage to the mill.

"Wm. B. Whiting, *Secretary.*"

"Boston, Mass., April 8, 1878. Upon examination of the burned portion of the Pacific Mills, in company with Mr. Rideout, the overseer of the watch, I learned the following respecting the efficiency of iron and tinned wood doors in resisting the late fire: —

"1. At the west end of the steaming-room, where the fire originated, is an eighteen inch brick fire-wall, in which are double doors made of two inch plank and tinned on both sides, put in, as I am informed, at the instance of Mr. Whiting, within five years. The flames were in direct contact with one door during an hour or an hour and a half, in which time the building on fire was destroyed; but no flames entered the other room, and only a portion of the paint on the other door, eighteen inches distant, was blistered. Upon removing the tin from the door which resisted the fire it was found that the wood had been charred to the depth of three eighths of an inch.

"2. A tinned wood door on the same floor, at the entrance to the packing building, subjected to a somewhat less degree of heat, resisted all action of the fire.

"3. In the second story, at the east end of the folding-room, are a pair of wrought-iron doors, constructed of 5-32 iron, with a frame made of three eighths inch bars iron three and one half inches wide. One of these doors warped about six inches; the other was held by bolts at top and bottom.

"In the opinion of Mr. Rideout the iron doors were not exposed to as severe heat as the tinned wood doors referred to.

"On the northerly side of the press-ing room (the corner room) is a sliding iron door, constructed of one fourth inch iron and heavily backed by seven sixteenths inch iron. The panels are about six inches in width, so that most of the door is eleven inches in thickness.

"This door is hung on trucks, and, when shut, three sides are in iron grooves; the fire department of the Atlantic Mills threw a large amount of water into this room soon after the alarm was given, and only a portion of the door was burned; yet this door is so badly warped that it can be moved only with great difficulty.

"4. The appearance of the doors and the statement of the experienced persons present at the fire are to the effect that wood doors covered with tin successfully resisted intense heat for a long time, and that iron doors, of exceptionally good construction, warped under a comparatively slight degree of heat. Respectfully, C. J. H. Woodbury, *Inspector.*"

A Steeple-Jack's Feat. — The *Sussex Daily Post* says that the vane on the steeple of Hurst Church being out of order, the rector offered ten pounds to any one who would climb up to a height of 130 feet and send it down for repair. The offer was accepted by John Bishop, formerly a sailor, who, having got into the clock tower, lassoed the pinnacles of the windows at the base of the steeple, and, having by this means passed a rope round the building, actually walked up the steeple. The feat was accomplished by a method well known to sailors, the climber holding the free ends of the rope, and planting his feet firmly against the object to be climbed, keeping the rope at a safe tension. As the climber advanced he jerked the rope upwards, and so progressed to the top. He safely reached the top and sat there four hours while the vane was being repaired. He then replaced it, and came down in safety.

Climbing Washington Monument. — A feat of daring equal to that above mentioned was done a short time ago by the rigger who volunteered to climb to the top of Washington Monument by the rope which, at the time work on the shaft was abandoned a score of years ago, was left hanging down from the summit on the inside of the shaft, so that when work was resumed it would be possible to reach the top without rebuilding the scaffold. The adventurous rigger reached the top in safety, although he was weighted by the ever-increasing weight of the new rope, to attach which was the object of his climb. The new rope seemed he cast off the upper end of the old rope, which fell to the bottom of the shaft and was broken into innumerable fragments, so rotted was it by exposure to the action of the weather.

The London Opera House. — It is once more reported that work upon the new National Opera House on the Victoria Embankment is to begin again. These reports, however, seem to lack confirmation. It is also reported that an apartment house, in design similar to the adjoining St. Stephen's Club, is to be built on the already finished foundations.

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CONTENTS.

SUMMARY:—
The New York Building Department Investigation.—Communism at Home and Abroad.—Proposed Convention to Consider the Mississippi Floods.—Details of Captain Cowdon's Scheme.—The Experimental Decoration of the Dome of St. Paul's Cathedral, London.—Discussion of the Decorative Treatment Appropriate to the Building.—Domestic Architectural Style in England and its Effect on Domestic Life.—Relations of Archæology with English and American Architecture.—The New Eddystone Lighthouse . . 45
PAPERS ON PERSPECTIVE. XII 47
THE PANATHENAIC FRIEZE 48
THE ILLUSTRATIONS:—
The Hull of the Vase, of the Biga, and of the Rotunda in the Vatican at Rome.—Perspective Diagram.—House in Philadelphia.—Longitudinal Section of St. Paul's, London . . . 49
THE SEWAGE SYSTEM OF PARIS. II 50
CORRESPONDENCE:—
Letter from Boston 51
MINING ACCIDENT IN NEVADA 51
NOTES AND CLIPPINGS 52

IN the *American Architect* of June 29th we had occasion to express the hope that, in the interest of good building, the management of the Department of Buildings in the city of New York would continue to be an object of public criticism, to the end that its vigilance might be kept alive and its abuses, if any, abolished. Since then an attempt has been made in the Board of Aldermen to institute a thorough investigation into the alleged neglects and delinquencies of the Department; the failure of this attempt encourages the idea that this important office is really under the protection of politicians, that it may serve as an easy and comfortable asylum for their relatives and friends at the public expense. Happily, however, a provision has been discovered in the city charter under which, on application of any five citizens who are tax-payers, a judge of the supreme court of the district may order an inquiry into the conduct of any officer of the corporation, so far as relates to misapplication of funds, violations of law, incompetence, neglects, or misdemeanors. In accordance with this wise provision we now learn that the matters of the Department are at last to undergo an exhaustive legal examination, in which the instigators of the inquiry expect to prove numerous wilful violations of the city charter and the building laws: a reckless and dishonest management; the employment of large numbers of incompetent men in sinecures with fat salaries; the concealment of such delinquencies and neglects under false and deceptive reports, through which unnecessary and extravagant appropriations have been granted; and the diversion of a large part of these appropriations to illegal uses. The expenses of the department, since Mr. Adams took charge of it, have aggregated, it is said, more than $550,000; the citizens who are interested in procuring this investigation expect to show that the work for the same period could have been honestly done for less than $100,000. We understand, also, that the abolition of the department and the transfer of its duties to the fire-department is advocated as a measure of public economy and safety.

SINCE the advent of Kearney in New England, where he is naturally an object of noisy curiosity, and where he obtains an enthusiastic following among those workingmen who are more interested in blasphemous denunciations of society than in logical arguments, the question of communism has again been revived, and again this foreign scarecrow has been set up to affright the frugal, the industrious, and the prudent. We naturally turn to the Old World to learn what is the present attitude and aspect of the modern Guy Fawkes on his own ground. Two great congresses of workmen have lately been held, at Lyons and at Gotha. While at the German congress it appeared that the foundations of society must be uprooted before the German agitators will be satisfied, in the French congress the communistic element failed to show itself in any form. In a notable article in the last *Fortnightly Review*, Mr. Frederic Harrison draws attention to the remarkable fact, proved by this gathering of French malcontents, that communism in France no longer exists; that in the twelve days' discussion at Lyons, no systematic socialism was discussed, and the great majority of the meeting maintained the usefulness of property as an institution, made no attack upon capital, brought forward no crazy scheme for the regeneration of society by legislative or revolutionary means, and in short gave utterance to no such rubbish as may be heard in the agitators' meetings in this country, where the talk is much wilder and much more unreasonable than among the older children of discontent. Of course the French workmen claimed that the condition of labor is radically wrong, that the economic relations of society are inconsistent with the advance of true civilization, and that no confidence is to be placed in any party or in any person now in public life. Unlike the English workingmen's party, which accepts the representation of their interests in Parliament by such capitalists and gentlemen as Messrs. Brassey, Mundella, Forster, Thomas Hughes, and Lord Litchfield, the French artisans accept as leader no one in the legislative chambers. They propose in some way to work out their own salvation, but not by revolution or other political crime. The intelligent mechanics and laborers of New England who attend to their business, vote according to their conscience, go to church, and invest their earnings in savings-banks and in United States' bonds, as thousands of them do, form a class in which the vulgar Jack Cade of the republic will find no recruits, a class which will redress what grievances it may have after no imported fashions of violent subversion, and according to no theories of communism. They will not lie behind the best of their French and English brethren as members of a civilized community, and will not put themselves in the hands of dreamers, doctrinaires, or demagogues, whether from America, Germany, or Ireland.

AT a public meeting in Memphis on July 26th, it was resolved that a convention should be held in that city on the 12th day of November next, for the purpose of considering what can be done to relieve the Mississippi in times of flood, and to provide means of constructing the Barataria Canal, with locks at the upper end and sea-walls at the lower, and of such a size as to admit the passage of the largest ocean steamers. The attractive resolution that the convention should proceed bodily down the river in steamers, for the purpose of arriving at a better understanding of the situation, was also passed. The Secretary of War was invited to cause a survey of the proposed route, and an estimate of the cost of its construction, to be made. The meeting furthermore indorsed the scheme of Captain John Cowdon, to the detailed explanation of which it had just given attention. As far as we can make out from the account that has reached us, Captain Cowdon thinks that what has been done, as well as what is doing, are not the means that will be most likely to achieve the desired results. He believes rather in relieving the river by providing it with more outlets, and by the shortest possible routes, arguing that the effect of thus increasing the discharge will be to diminish the volume of water, while at the same time it increases the velocity of the current, and consequently the scouring capacity of the stream; so that in course of time the river will wear for itself a permanent channel, to which it will return after a flood, and being thus confined to a narrower space the formation of the ever-changing sandbars, which are due to the sluggishness of the stream in the broad parts, will no longer be possible. This theory is supported by the facts that since the establishment of the Bonnet-Carre Crevasse, by which it is estimated one twelfth of the volume of water escapes through Lake Ponchartrain into the Gulf, distant less than eighty miles, while the mouth of the river is distant one hundred and sixty miles, the high-water mark at New Orleans, where the usual rise is seventeen feet, has fallen three or four feet, while at Natchez, where the rise is nearly fifty feet, a decrease of eight feet has been recorded, a similar proportionate subsidence having been observed at other places farther up stream.

THE practical utility of such artificial outlets having been proved by observations taken during five years, Captain Cowdon proposes that other outlets shall be built, and notably an opening shall be made into Lake Borgne, a little farther down stream than Lake Ponchartrain, which shall be ten or twelve feet deep, one mile wide, and about six miles long. This, it is

calculated, will draw off another twelfth part of the river water, and cause a corresponding lowering of high-water level; so that even as far up stream as Memphis, where the present level is about thirty-five feet, a fall of four or five feet will be established. Besides this outlet, he proposes to open the Pass Manchac and the Plaquemine, the Coule, the False River, and the Lafourche Bayous, just below Baton Rouge, which will aid in carrying off the waters of the lesser floods. A still more important factor of his scheme is the diversion of the course of the Red River, which now empties into the Mississippi about halfway between Baton Rouge and Natchez. To effect this the river is to be made to pass through the Bœuff, which is about twenty miles in length, and into the Calcasieu River, by which, after a course of some hundred miles, it will reach the Gulf. In this distance the river will have a fall of about eighty feet, which is as much as the Mississippi has between its junction with the Red River and its mouth, although the distance is about five hundred miles. If these projects are ever carried into execution they can hardly fail to be of the greatest benefit to the States through which this river flows, and particularly to Louisiana, whose lowlands, now annually exposed to destructive floods, the proposed operations will allow to be reclaimed and cultivated.

The interesting question of the decoration of the interior of St. Paul's Cathedral, London, has again been brought up by the action of the Dean and Chapter on the 6th of July in authorizing the preparation of full-sized cartoons of two of the ribs of the dome, and of all the architectural features between them, comprising one sixth of the whole domical area; these cartoons to be colored and gilt in imitation of real mosaic, and temporarily fixed in place, so that the effect of the actual work may be realized. The design of the late Mr. Alfred Stevens, the architect of the Wellington Monument, lately completed and erected in the cathedral, is to be followed substantially according to the model prepared by him. Mr. Stannus, a favorite pupil of Mr. Stevens, is to prepare the cartoons for the ribs; Mr. Leighton is to make the design to occupy the proposed great circle between the ribs (probably just above the springing of the dome); and Mr. Poynter will compose the other figure-subjects of the composition. It is proposed to decorate the dome with subjects from the visions of the Apocalypse, reserving the pictorial and dramatic scenes from the Old and New Testaments for the lower parts of the building. The general disposition — the emotional and poetic above, the historical and didactic below — is one which must commend itself as singularly appropriate to the place and occasion. Although by the use of bright colors upon a gold ground in the Byzantine manner, as proposed, the serious defect of the extreme darkness of the dome will doubtless be partially obviated, the mysterious and solemn splendors of the mosaics in the Italian domes enjoy reflections from far brighter skies than can ever prevail in gloomy London; the subcommittee therefore ingeniously recommend the introduction of metallic reflectors, so placed within the external peristyle of the dome as to be invisible from any point of sight outside or inside of the building. By this means Mr. Penrose, the architect of the Chapter, calculates that the amount of light at present introduced through the twenty-four windows in the drum of the dome will be doubled. The committee estimate the total cost of the decoration of the dome according to this scheme to be about fifty thousand pounds sterling, the Messrs. Powell, of Whitefriars, having offered to do the sixteen thousand square feet of mosaic in the dome at the rate of from thirty to thirty-five shillings per foot. The estimate of the Murano company was forty shillings.

Mr. Edmund Oldfield, a member of the executive committee for the completion of St. Paul's, it may be remembered, in his book, "St. Peter's and St. Paul's," published two years ago, entered into a careful investigation of the color decorations of certain typical Italian buildings of the sixteenth and early part of the seventeenth centuries, with a view of ascertaining what features of them were capable of application to the English Metropolitan Cathedral. In this interesting work of comparison, the description of the decoration of St. Peter's is probably the most complete that has been published in England. The lesson drawn from this great example by Mr. Oldfield has been very intelligently applied in the development of the new scheme for the decoration of the English dome, the main points being the adoption of a formal or geometrical distribution, keeping the most important subjects in the lower parts — both domes being prolate hemispheroids; the multiplication of figures, to give an idea of great space; the adjustment of their scale, so that they shall be large enough to secure distinctness, but small enough not to dwarf the vault or to be so spread over the spherical surface as to distort their drawing; a severe and statuesque but not archaic treatment of the figures, and their execution in coarse tesseræ, without the minute elaboration of the Vatican mosaicists; and, finally, the use of gold backgrounds, contrary to the common cinque-cento practice, thus securing flatness, like the vault surface itself, and reflections which most effectually and beautifully illustrate the constantly changing surface of the hemisphere. Mr. Oldfield also obtained from the church of St. Vittore at Milan an idea as to the treatment of panels in piers, which he recommends for adoption in St. Paul's. The portion of Mr. Burgess's remarkable scheme for the decoration of the English cathedral which elicited the most vigorous and probably the most justifiable remonstrances, a few years ago, was his proposition to cover entirely the Portland-stone piers of the nave with a veneering of fine marbles. In this regard the hints derived from St. Vittore are interesting for their adaptability not only to the case of St. Paul's, but to other and less monumental examples. In the Italian work in question white stucco figures appear in very low relief upon the flat tinted ground of the panel, without interference with the structural character of the pier, the natural material of which is properly exhibited in the styles. This use of stucco admits of great freedom of treatment, and belongs strictly to the most approved period of Renaissance decoration, having been adopted not only by Raphael at the beginning but by Alessi at the end of the sixteenth century. As a reminder of the conditions which must guide the English designers in their work we reproduce in this number a sectional view of the interior of St. Paul's.

The *Architect* of July 6th contains a noticeable article on the question of Domestic Architectural Style as it now prevails in England, and, with a natural but uncertain reflection, in our own country. Accuracy of reproduction of old forms has never been so faithfully pursued as by the English architects of the present day. Archæological correctness in every detail, from the architectural outlines outside to the fashion of tables and chairs and the color of walls and fabrics within doors, must be carried to such an extent that the occupant of the house may well imagine himself "somebody else somewhere else," and by no means an Englishman of the nineteenth century at home. The tendency of domestic style is therefore, as the *Architect* cleverly puts it, to be histrionic, with all the appointments in keeping; so that, naturally, the dwellers in the new Queen Anne houses of Turnham Green, or St. John's Wood, as we remember reading not long ago, may be seen in the lanes thereabout seriously masquerading in Addisonian bag-wigs, cocked hats, and small-clothes, in order to keep up the pleasing illusion; and we are credibly informed that the fairer sex, with that exquisite power of adaptation for which they are noted, are not slow to follow suit with brocades, hoods, hoops, and farthingales, and the decorative patch upon their faces. English life seems therefore ready to meet English architects half-way, and were it not for the autocratic decrees of the *modistes* of Paris, which constitute an element hard for the female mind to go counter to, we might see the court of the good Queen Anne reënacted in high life, and not confined to narrower fields among the families of artists and *littérateurs*. In like manner, in the days of the Gothic revival we might have seen in certain select English circles a reproduction of the costumes and attitudes of mediæval saints, more or less grotesque, often graceful, but always highly significant of the power of histrionic architecture. Mr. Norman Shaw and his followers nearly make us believe that

> "All the world 's a stage,
> And all the men and women merely players."

This is a new function for architecture. Perhaps it needs only a little more pushing of the "Old Colonial" derivative in this country, on the part of our clever young architects, to bring about some corresponding form of revival here. Who knows what stately virtues of the Province may follow on the reintroduction of slender orders and broken pediments, urns and festoons, heavy sashes, small panes, and delicate mouldings; what fine manners may come back in front of tiled chimney-pieces, and panelled wainscots, and under the wooden modillions and dentils of the parlor cornice!

DOUBTLESS the logical result of designing accurately according to precedent must be literal imitation, carried to extremes sooner or later, and in England there seems at present to be small chance of setting aside this unwholesome subservience to archæology. "Granting all this," the *Architect* proceeds to say:—

"We" (Englishmen) "must perhaps be permitted to advance in the direction of histrionic accuracy until some other principle comes to assert itself. Such a form of art is not by any means to be despised, inasmuch as that which preceded it may be affirmed with no little reason to have been no form of art at all. It is obviously better to copy thoroughly well and enjoy the success of it than to go into chaos and have nothing at all to enjoy. In other words, if we cannot achieve anything in the nature of characteristic style, except by accepting a histrionic — or any historic — mode, this is at least better than being content to sacrifice the enjoyment of style altogether."

Our own conditions are more favorable for the achievement of characteristic style, as the fashions which come to us from Europe are not powerful enough to overthrow the practical influences which our architects must obey; influences which come from local habits, materials, climate, and usages, from the new life of the New World; influences which have grown with our growth, and must have expression in our art in spite of all our efforts to play parts in borrowed costumes. We are not permitted to forget that we are Americans and not Englishmen, and that our comparative freedom from the tyranny of archæology is a national privilege. We may master it, but it cannot master us. It is too far off.

As the downfall of Eddystone Lighthouse, if not imminent, is at least inevitable, and a matter of measurable time, owing to the disastrous effect which the leverage of the slightly swaying shaft has had on the House Rock upon which it is built, Trinity House has occupied itself with the question of what must be done to replace it. A survey showed that the rock was at once too small and too decayed to allow of building a second shaft upon it,—for it is a *sine qua non* that the present lighthouse shall stand until the lamp is lighted in its successor,—and that a light at this particular point was a better protection against the rocks and reefs lying inshore of it than a light placed in any other position would be. It was suggested that the necessity of any lighthouse could be done away with by removing the rocks, and so great has been the progress in submarine engineering that, although the survey which was made in pursuance of this suggestion showed that many million cubic feet of stone would have to be removed, the enterprise would doubtless have been undertaken, had it not been that the abolition of the light would necessitate a considerable and costly revision of charts, and the determining of new "ranges" for the guidance of ship-masters, to say nothing of the temporarily increased danger to the lives and property of those to whom for many years the Eddystone Light has been so great a reliance, marking, as it does, an important landfall to incoming vessels from the Atlantic. In view of this necessity of maintaining a light, it has been determined to build a new lighthouse on the South Reef, one hundred feet distant from Smeaton's decaying masterpiece; and as the lowest tender amounted to $525,000, Trinity House has decided not to do the work by contract, but to have it done by the day, under charge of its own engineer, Mr. J. N. Douglass, whose estimate was only $450,000.

THE natural difficulties presented by the new site are about as great as those encountered by Smeaton; for though the South Reef is not uncovered until half-tide, and some of the foundation courses must be laid under water, while the site on House Rock was always above half-tide level, and a portion of it above high-water level, yet the new site is in a more protected position. In the actual construction of the lighthouse, nothing novel is to be attempted. The now common practice of dovetailing each stone into those above, below, and by the sides of itself, as well as, in the case of the lowest course, into the living rock, is to be followed. The lowest twelve courses, which will rise twenty-two feet, and will carry the shaft three feet above high-water level, are to be forty-four feet in diameter, and are to have no diminution from bottom to top. At this level the shaft proper will begin with a diameter of thirty-six feet; thus there will be formed at this level a circular landing stage four feet wide. In form the new shaft is to be a concave elliptic frustum, its least diameter, eighteen and a half feet, being about one hundred and twelve feet above the landing stage, from which level it increases again, until at the top it measures twenty-three feet. The lantern level is one hundred and twenty-two and a half feet above high-water level; that is, the new light will shine at a height fifty-five feet above the present light. Up to twenty-two feet above high water, the shaft will be built of solid granite; above this the walls will vary in thickness from eight and one half feet to two feet and three inches, which will allow of rooms varying from eleven to fourteen feet in diameter.

PAPERS ON PERSPECTIVE.

XII. THE PERSPECTIVE OF CIRCLES CONCLUDED. CONCENTRIC CIRCLES.

243. WHEN a portion of a circle is to be put into perspective it is generally best to construct the ellipse which represents the whole circle, and then to use so much of it as may be required. This is especially the case in sketching from nature or from the imagination, where it is difficult to determine the character of the perspective curve without aid from geometrical considerations. In drawing pointed arches, for instance, the character of the intersecting arcs is best ascertained by completing the circles of which they form a part, as in Fig. 52. An inspection of the figure shows that when the arch is above the eye the nearer half is represented by the part of an ellipse at which the curvature is the most rapid, near the extremity of the major axis; and the further half by the flattest portion, near the extremity of the minor axis. When the circle is below the eye the nearer part is the flattest.

This figure also shows that when a row of circles are put into perspective their major axes are not parallel, their inclination to the trace of the plane in which the circles lie diminishing as they recede from the eye.

244. Fig. 53 illustrates more fully the sub-contrary section spoken of in the previous paper and shown in Fig. 44. A′ A′ shows the circle in its own plane, with its centre beyond the axis of the cone; B′ B′ shows its perspective in the plane of the picture $p\,p$, with the centre of the cone of rays below its centre, and the pole a, representing the centre of the original circle, lower still; E′ E′ shows the real shape of the cross-section E E, taken at right angles with the axis of the cone. This is an ellipse, whose centre coincides with the axis of the cone of visual rays, the centres of both circles appearing as poles of the ellipse, one on one side and one on the other. The projections of the respective centres are shown in each case at a, b, and s.

The line D D, parallel to A A, shows that a horizontal section of the cone taken at this place must be a circle like A′ A′; and since the sub-contrary section at E E is symmetrical with it, about the axis of the cone, it follows that B′ B′ also must be a circle.

245. It is to be noticed that the ellipse E′ E′ is the appearance that the circle would present from the station point S. It would not appear as a circle, though its perspective is a circle. But neither does this perspective circle appear as a circle. It, too, is foreshortened into an ellipse in the sight of a spectator at S.

246. In fact, unless a circle is situated just at the centre of the picture, the ellipse which represents it in perspective is of a different shape from the ellipse which it presents to the eye. Horizontal circles, for instance, always present to the eye horizontal ellipses; ellipses, that is to say, whose major axes are horizontal. But in perspective such circles, unless just above or below the centre C, have their axes inclined, as we have seen in Fig. 47. Yet these oblique ellipses when seen from the proper position, the station point in front of C, are themselves apparently changed by the effect of perspective, and foreshortened into horizontal ellipses.

This apparent distortion in the perspective, which makes the outline of the drawing of a different shape from the apparent outline of the thing drawn, will, as has been said, form the subject of the next paper.

247. Figs. 54, 55, and 56 show three different ways of drawing concentric circles. Since concentric circles have the same centre, the ellipses which constitute their perspectives have of course the same pole and polar line; but the ellipses have not the same centre, nor are their axes parallel.

248. The first method is shown in Fig. 54; it is applicable to the case where the perspective of a circle is obtained by means of a circumscribed square or polygon. A second circle, concentric with the first, is easily obtained by means of a concentric polygon, as shown.

249. Fig. 55 shows how the second ellipse can be found when the first has been already determined in any way. Let a line of measures be drawn through the pole which is the perspective of the centre of the circle, parallel to the polar line or trace of the plane in which the circle lies. If now any chord $a\,a$, representing a diameter of the circle, be drawn through this pole, and lines be drawn from its extremities to any point V upon this trace or horizon, it will cut the line of measures at two points, a' and a', whose distance from the pole is the same. If now two other points, b' and b', be taken, also equidistant from the pole, and lines be drawn through them, the points b and b, in which they intercept the same chord, will be points of an ellipse which represents a circle concentric with the given circle, and as much smaller as $b'\,b'$ is smaller than $a'\,a'$. In the figure the radius of the smaller circle is one half the radius of the larger one, $b'\,b'$ being one half of $a'\,a'$. It is obvious that since the lines

meeting at V are parallel in space, the lines *a a* and *a' a'* are divided proportionally. Any number of points can be obtained in the same way as *b b*.

250. A third method of putting concentric circles into perspective is shown in Fig. 56, — a figure which, like Fig. 47 in Plate X, shows three equal circles, A A, B B, and D D, lying in parallel planes and equally distant from the picture, the last of which stands *edgeways* to the spectator, so that it coincides with a portion of T R Z, the trace of the parallel planes. In the figure it is supposed that A A is the given circle, concentric with which it is required to draw another circle E E.

To effect this the circle D D is first found by cutting off from T R Z a portion equal in height to A A, this height being measured above and below a line passing through the centres of the three circles. Parallel to this line let a second line be drawn through any point, 1, of the circle A A, to the corresponding point, 3, of the circle D D; and upon this line let any convenient point, as 2, be taken as the corresponding point of a third circle B B. If now a fourth point, 4, be taken upon the line through the centres, the line 4 2 5 will be an element of a cone whose vertex is at 4 and whose base in the plane of the circle A A is a circle concentric with that circle. The intersection of the line 4 2, prolonged, with a radius of A A drawn through the point 1, fixes the point 5, in the circumference of the circle E E. By drawing other lines, parallel to the line 1 2 3, through other points of A A, any number of other points in B B and E E may now easily be obtained.

The radii of the circles E E and A A (or B B) are obviously proportional to the distance of the point 4 from the centres of E E and B B, and also to the chords drawn through the common centre of A A and E E parallel to the trace T R Z, that is, to D D.

251. It will be noticed, 1st, that this method not only gives the means of finding a larger circle concentric with A A, and lying in the same plane, but also of finding an equal circle, B B, lying in a parallel plane; 2d, that it makes no difference in what direction the axis of the cone passing through the three centres is originally drawn, provided it is parallel to the plane of the picture; and 3d, that this method is as serviceable in drawing a concentric circle smaller than the given circle as in drawing a larger one; for if E E were the given circle a reversed process would give A A.

252. As to the figures 45, 50, and 51, the publication of which in connection with the paper which they illustrate was accidentally prevented, it is unnecessary to add anything to what was said in that paper. But it is perhaps worth while to say that the excessive distortion apparent in them is due simply to the fact that the station point, or proper position of the spectator, is in each of them within two or three inches of the page. This is within the limits of distinct vision. But by looking through a pin-hole in a card the prints can be distinctly seen when held even at the end of one's nose; and when so viewed it will be seen that not only the ellipses in Fig. 45, but the parabolas and hyperbolas in Figs. 50 and 51, look like circles, as they should. The apparent distortion entirely disappears.

253. Fig. 57, *a*, *b*, *c*, shows three different ways of obtaining certain points in a circle by drawing intersecting lines from the sides of a circumscribing square, and *d* shows that either of these methods may be used for finding the perspective of a circle.

THE PANATHENAIC FRIEZE.[1]

As our concern is now rather with the technical sculpture than its subject, it is sufficient to mention, as is well known, that this band of low-relief represents the procession which with pomp conducted a peplus or robe dedicated to Athene, the goddess of the people and city. As the enclosure of the Acropolis was entered, the subordinate or west front of the Parthenon was first approached, and the sculptures represent the divided procession advancing along the north and south flanks of the temple towards the eastern entrance. On the frieze over the eastern entrance are represented two groups of divinities, heroic ancestors, male and female, seated, of larger scale, and apparently watching or waiting for the procession. Between them, and central over the doorway, is seen a priest, who delivers the folded peplus to a youth, and a priestess, who is committing a charge to maidens. The procession consists of men ordering its course, others bringing along the oxen and sheep for sacrifice, ranks of girls, musicians, water-bearers, then chariots, and, above all, a long train of the mounted youth of Athens. It is in the treatment of this part of the procession that the sculptor has displayed the utmost indifference to difficulty, the most consummate judgment and skill and daring and invention, and has successfully evoked the most engaging beauty from under the very ribs of difficulty and confusion.

The height of the frieze itself, as of its position above the eye, was limited by architectural proportion, and a limit was thus imposed on the sculptor for the height of an erect figure; he availed himself of what space was given to him to the utmost, and there is but moderate room to spare above the heads of the few young men who are standing erect. The height at which the frieze was elevated, and the oblique view from the narrow ambulatory below which alone commanded it, made this imperative if a diminutiveness was to be avoided which would preclude finish and recognizable features and expression. Another consequence of these conditions was that a liberty had to be taken with nature in respect of the scale of the horses of the mounted cavaliers, which was disproportionately reduced. The riding figures are in some degree reduced, as compared with those on foot, and quite without reference to perspective, but this difference is trifling, and although something more is gained for the size of the horses within the limit of height by their extended action in most cases, the horses are still unnaturally small. They have the characteristics doubtless of a small and sturdy breed, but it is clear that the artist deliberately ventured the incongruity. The alternative to reduce the stature of the men was inadmissible, and he had just confidence that even if the spectator noticed the disproportion, which many do not, he would, if a worthy spectator, willingly compound for it by a sense of the energy of the composition, which would be adequate expression of any amount of vigor. An over-sized rider in nature seems to oppress his steed, but such lightness and spirit are thrown into the animals of the frieze that not even where disproportion might be feared as salient is there any suggestion that the load is not carried with abundance of strength to spare.

The costume of the riders is varied for the sake of variety, of contrast, and of composition, but for such reasons alone, with no intention to snatch applause for naturalism. Some are nude but for a flying cloak, and are seated like the rest on bare-backed horses; others have tunics, which, if it is thought instructive, may be called chitons, as the cloak a chlamys. Here and there irregularly is a cuirass, different in every case. Heads are usually bare, but sometimes covered by cap or helmet, in one or two cases by the broad-brimmed Thessalian hat. Such spareness in equipments might seem to throw back the representation to the traditional heroic, or even to still earlier mythical epochs; but there is no reason to think that heroic habits were otherwise interpreted than as subserving the idealization of a familiar contemporary celebration.

The style of relief is not without a certain analogy to that of some of the Assyrian representations of hunts and battles by the king in his chariot. The Assyrians set an example of moderation in prominence or projection, but the very despair of clumsiness is displayed by them in their management of figures moving in two planes, and of which some are partly covered by others in their front. The majesty of Assyria binds his bow as he stands in a car drawn rapidly by three horses yoked abreast, like those of so many Homeric heroes. The horses' heads are seen advanced one beyond another, but the twelve legs of the animals are left to be assumed on the insufficient evidence of three fore and three hind legs in like parallel presentation. The Assyrian, it may be thought, has as much right to conventionalize as the Greek; but a convention for the advantage of expression is one thing, and resort to it as a cloak for a difficulty not beyond the reach of skilfulness to overcome is something very different. The Greek challenged and vindicated his right to another license in disregarding perspective diminution, even when he represented so many figures retiring one beyond the other that the remotest must needs be at considerably greater distance. By the manner in which the knees of the four seated female divinities or heroines on the eastern frieze advance in succession beyond each other they are declared as occupying receding planes, but the actual proportions of all are identical, and the legs of the seats rest on the same ground line. It is the same with the cavalcade, where the ranks are repeatedly composed of as many as seven horsemen advancing abreast; the same ground line receives the hoofs that touch ground of the near and the remote alike. Chiefly from the obstructed view of the marbles, but not slightly in consequence of the disintegration of surfaces confusing outlines even where slabs are complete, it is not easy to appreciate the marvellous skill of these combinations at the museum[2] without the bestowal of steadily attentive consideration. It is worth while for those who are interested to take a preliminary view of the restored groups, as they may be seen in Pall Mall, below the cornice of the Athenæum Club. Here it is salient how the full flank of the near horse of rank after rank accentuates the series, and gives the key which makes simple the relative positions and movements of all those beyond it.

. . . . . .

It will be observed that in the foregoing brief note of a part of the action the exposition followed from the west eastward, as if following on with the procession. There are several circumstances which render this important and imperative. Whatever may be the reason, moving objects are more easily and comfortably observed as they are moving past or away from us than as directly advancing upon us: the action of the horses as seen from the rear is explained best — and is especially required to be so, when only observable under so oblique an aspect as was available — by the broad flank of the near horse, the seat of the rider and his bearing on the rein, and the posture of the hind-quarters of the animals, the fulcrum of propulsion. Certainly as we follow on with the frieze in this direction we seem to be in harmonious sympathy with the general movement of the celebration.

But there is something more in the matter, — something that may escape observation generally, but will be palpable when pointed out. If we pass along in the reverse direction, as if meeting the procession we are sensible not only of confusion, but of a certain harshness which is easily explained. We find that we are moving, so to say,

[1] From an article in the *Architect* by Mr. W. Watkiss Lloyd.

[2] The British Museum.

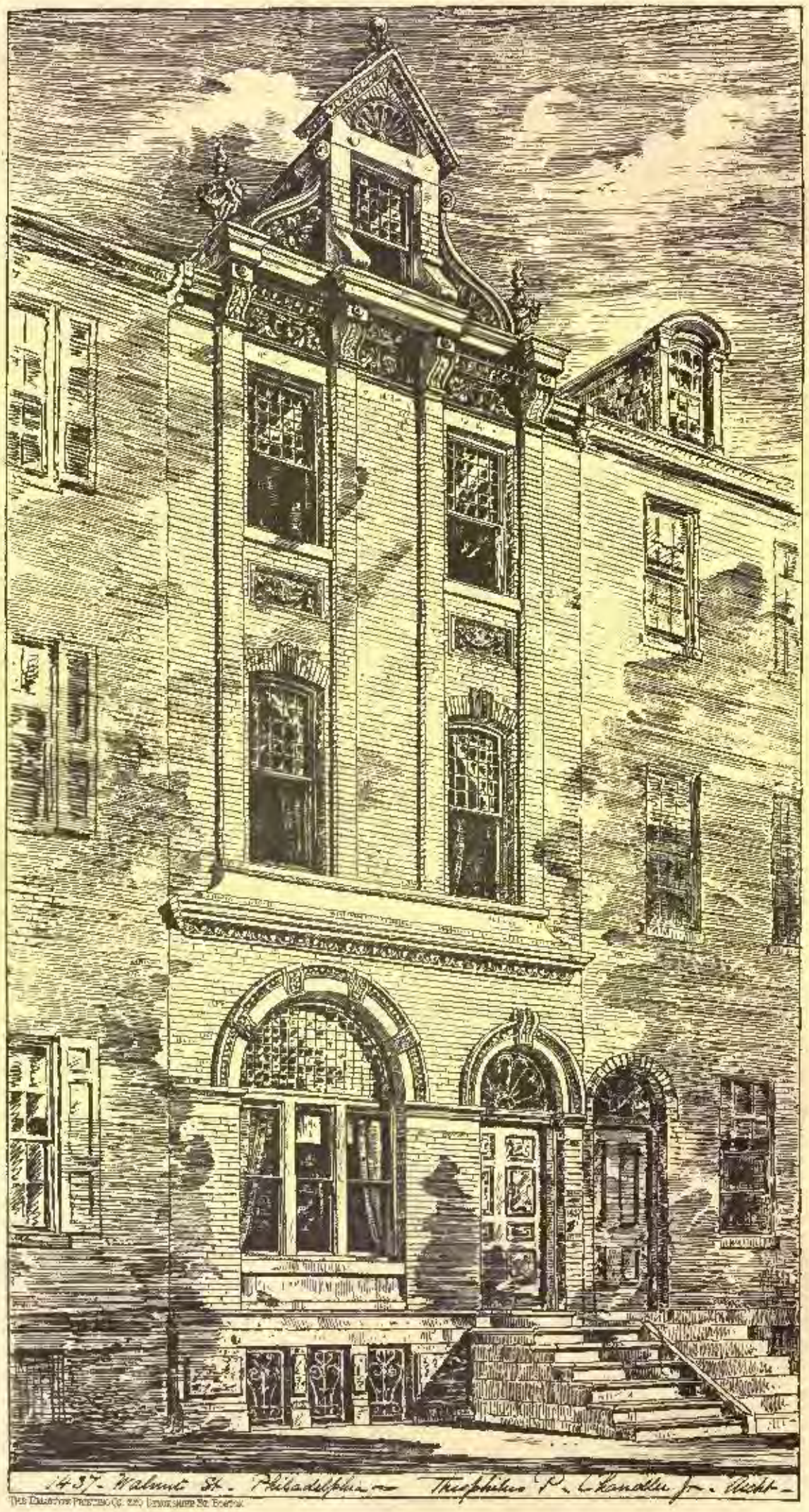

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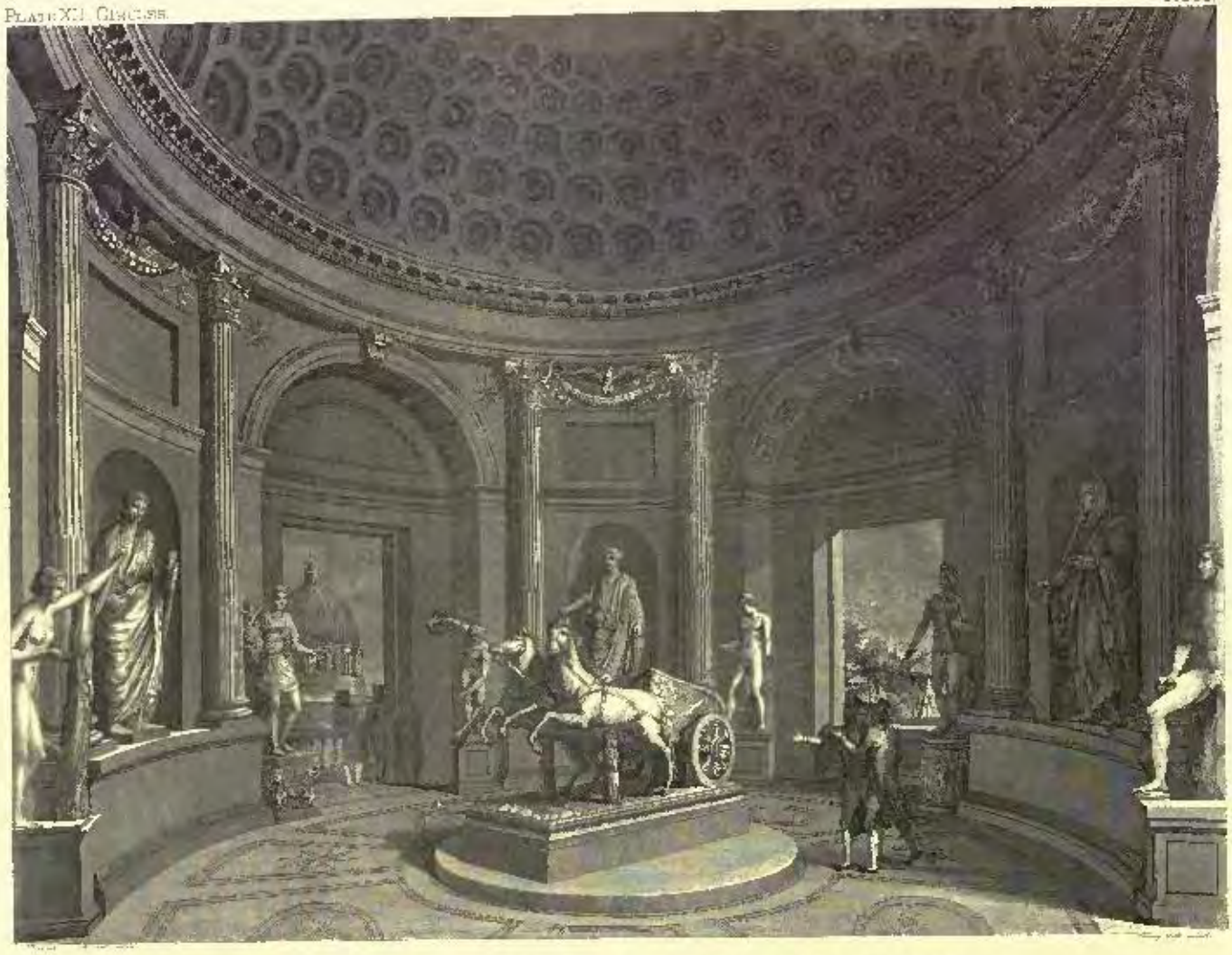
PLATE XII. GIROUX.

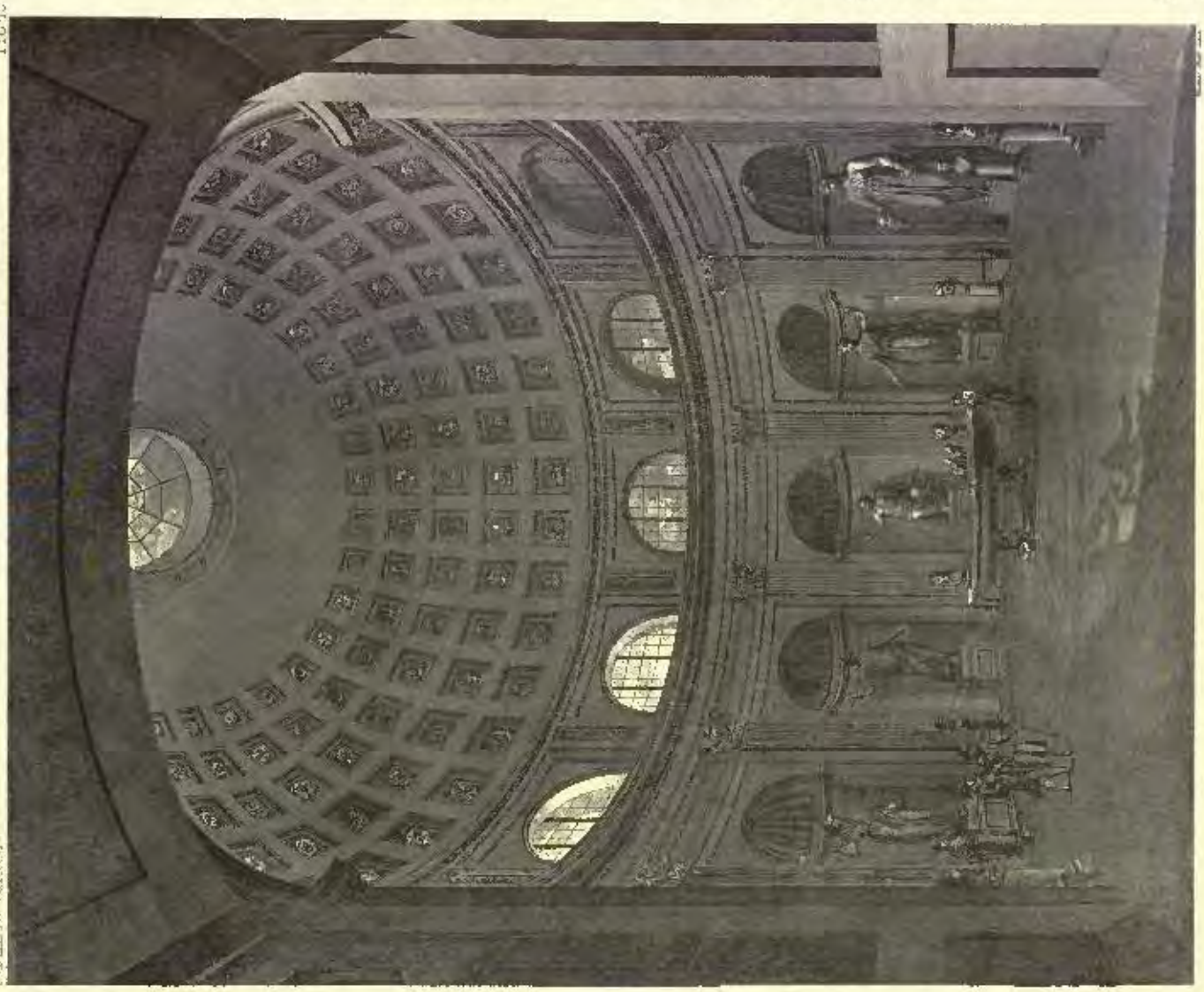
FIG 50.



THE HALL OF THE BIGA IN THE VATICAN MUSEUM

FIG 51.

THE HALL OF THE VASE IN THE VATICAN MUSEUM.



THE ROTUNDA IN THE VATICAN MUSEUM.

PLATE XI. (CROCE.)

FIG. 52

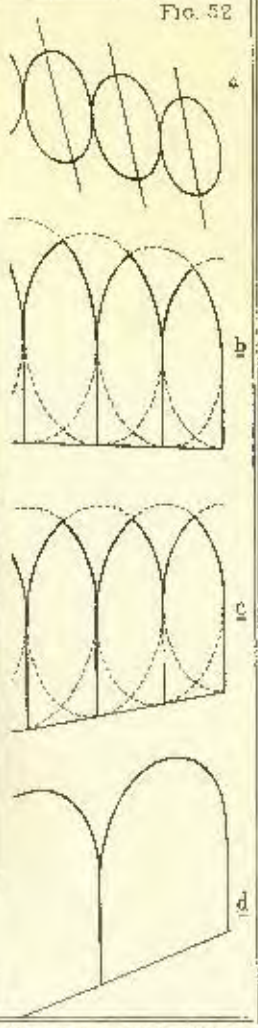


FIG. 53

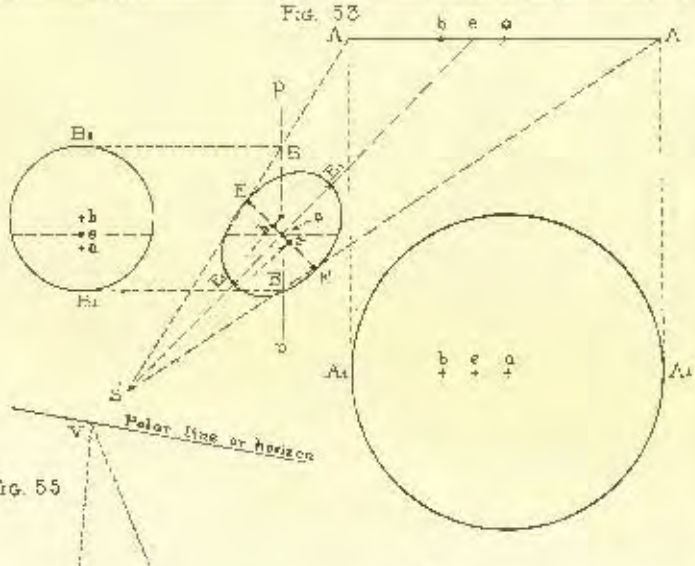


FIG. 55

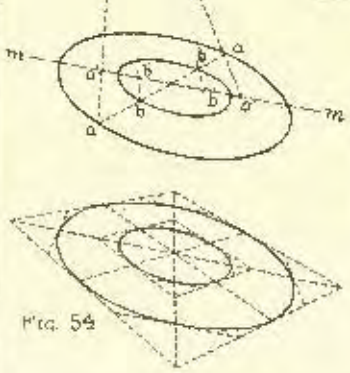


FIG. 54

FIG. 56

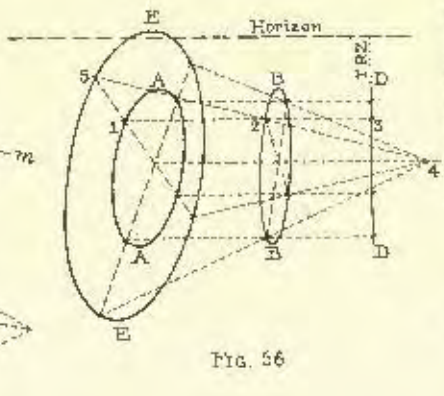
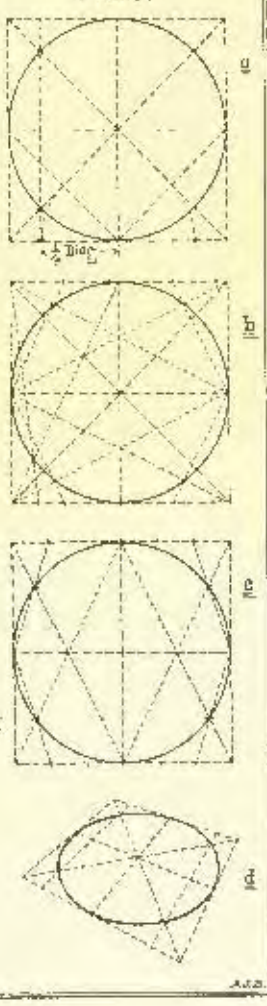


FIG. 57



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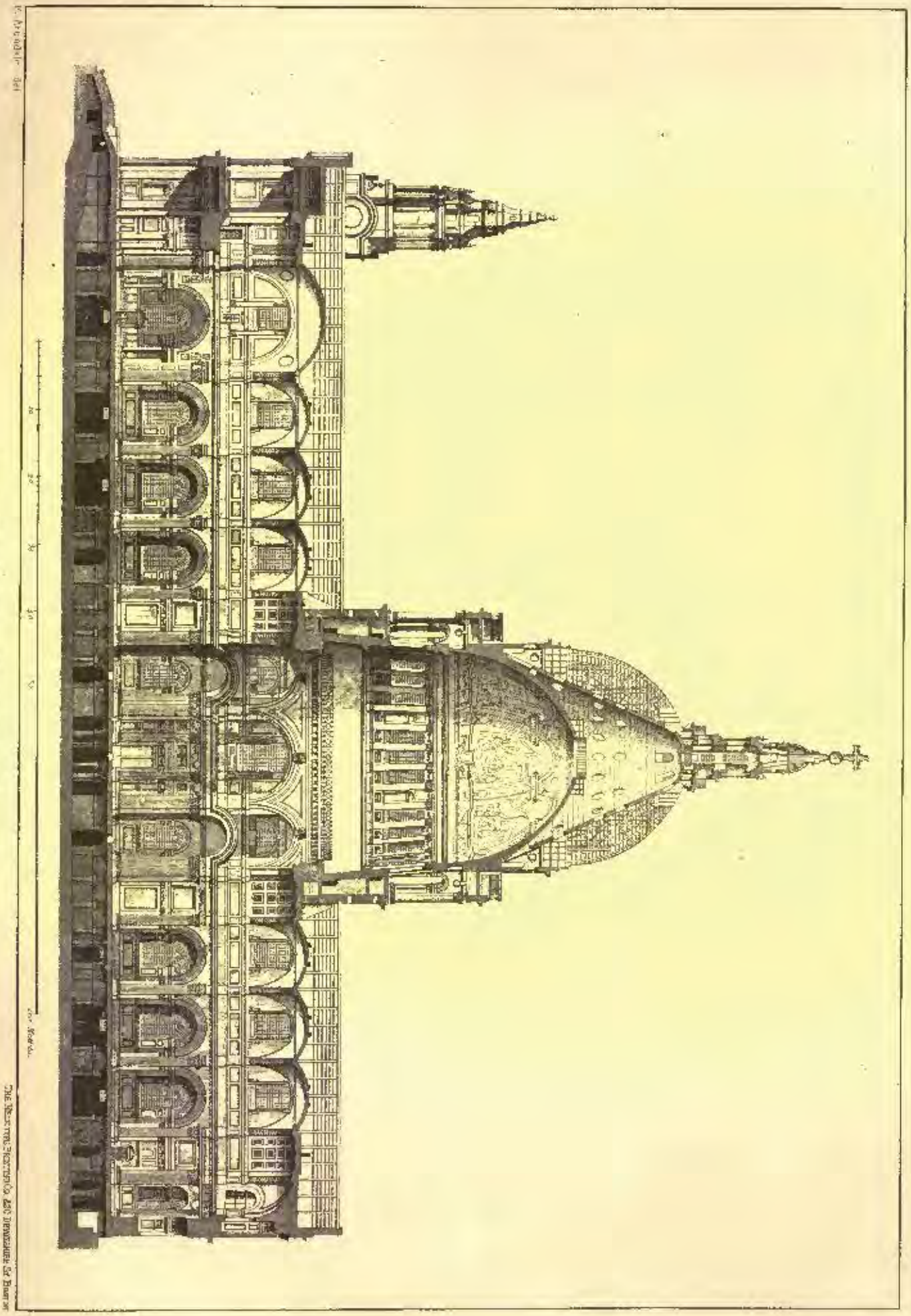


— ST. PAUL'S CATHEDRAL —
— LONDON. —

"against the hair," or rather upon rough edges. In fact, the rear outlines of the horses and groups generally fall in most cases towards the plain slab at a blunt angle, or are gradually rounded towards it. But with the front outlines the rule is in contrast; a quicker descent is given to the contours, — they meet the slab very constantly at a right angle, and in very important parts are even notably undercut. The forward outlines in consequence are relatively strengthened by shadow, and so far an element of decision and definition is introduced, like that given by thickened strokes expressive of shade in an outline drawing. But one consequence of this is serious, and the result is manifest, and nothing less than that the effect of the frieze as followed in one direction was deliberately sacrificed by the sculptor for the sake of enhancing it when contemplated in order from another.

He could, indeed, scarcely have adopted so elaborate a scheme of composition under any other conditions. Low-relief demands that the heads of the figures should be usually in profile, but they could not be set with outlines flattened on the plain slab consistently with relation to the space which had to be indicated for horses and ranks. Hence the profiles of the riders are constantly undercut; then cases occur in which the lower half of a face is in front of a horse's mane and neck, and the upper part above them, and free. The management, then, of the relation of both to the background is peculiarly awkward; and into all these unhandsome recesses we have to look if we persist, against the first warning incongruity, in meeting the course of the cavalcade. This is a great aggravation of the confusion which is presented when we come first upon the sight of the crossing legs of prancing horses, of which we do not know the distinct action till we pass farther on; but the sculptor was manifestly indifferent to the aggravation which would do him good service by warning the spectator away from a false aspect, as well as by supplying a contrast to the aspect which he was chiefly concerned about. In the groups at either end of the naos, which were naturally seen directly in front, and, indeed, from a wider pavement, the order of the figures is open, and the requirement for this special adjustment is avoided and ignored.

The development of the ranks of horsemen, by spreading them fan-like, so that the seven cavaliers successively are shown in advance of each other, most certainly simplifies the arrangement to the spectator, but goes little way to relieve the difficulty of the sculptor's problem. The planes which are required to account for the overlapping limbs are still most numerous. A near fore-leg of a horse will be relieved directly upon the leg of a rider beyond, as that upon the fore-quarter of the horse he rides, which is relieved again upon the limbs of more than one horse beyond before we arrive at the plain surface.

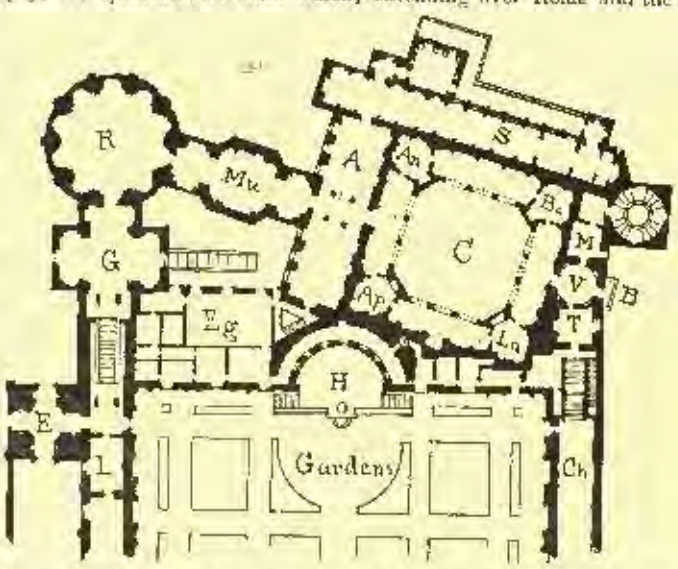
The general system on which the composition was designed and executed appears to have been this. We are led to infer that the design was drawn carefully in outline on the still smooth slabs, it must be supposed after a more finished drawing, which expressed by shading the refined surface depressions and undulations; it must then have been understood that the nearest portion to the front of every figure was to be expressed by the chisel with as little depression below this surface as possible; these highest and least rounded parts of each figure are in consequence maintained at a high uniform level, so that an applied flat surface would touch them all. There is a certain limit, scarcely two inches at most, to which the slabs are cut into below this plane, a distance which has to be economized and distributed among the superposed members — economized where necessary, and, where not, apportioned freely. It was thus imperative that the knee of a rider by a horse's flank should have very slight relief, in fact be almost flat, but where his leg extends in front of the haunch of a horse beyond and the open background it takes more rounded relief inwards. Where many surfaces have to be accounted for, as must be the case with the crossing limbs of men and horses in ranks, even the strictest economy in gradiated distribution calls for help, and then considerable liberty is taken of sinking the background beyond the average depth; but this is chiefly in recesses and small bounded spaces, where the stratagem escapes notice among the shadows.

Although the faces are usually in profile, other presentations occur, and even that of the full face: this variety is a relief of the greatest value, and seems to bring the spectator into more immediate and sympathetic relation to the gallant parade. It may also be remarked that the frieze preserves evidence sufficient in a number of completely preserved heads, male and female, to correct a hasty inference from the simple *chevelure* of the Dionysus (Theseus) of the pediment, that the elaborate treatment of the hair was posterior to Phidias. There are sufficient examples here to give indication of a mastery of an easy detail indeed, but of one which has its value in the expression of age especially, and even character. Indeed, the record of the ambrosial locks of his Olympian Zeus should settle the question.

THE ILLUSTRATIONS.

ILLUSTRATIONS ON PAPER ON PERSPECTIVE. PLATES XI. AND XII.

Figures 45, 50, and 51 are reproductions of some old engravings representing that portion of the Vatican Palace called the *Museo Pio-Clementino*. It was erected about a hundred years ago by Pope Pius VI., during his long pontificate of twenty-four years, to contain the collections formed by Julius II., Leo X., Clement VII., Paul III., and his own immediate predecessor, Clement XIV., — collections to which Pius himself added more than two thousand pieces. This irregular mass of buildings occupies the summit of the Vatican Hill, at the northern end of the gardens which separate it from the papal apartments, the Sistine Chapel, and the galleries and chambers decorated by Raphael. The rooms and passages shown upon the plan are the end of the long gallery of the Museo-Chiaramonti (Ch) arranged by Canova for Pius VII.; the Hall of the Torso (T), formerly a chapel, in which stands the famous Torso of the Belvedere; the Hall of the Vase (V), from which opens to the south the Balcony (B), the splendid view from which, extending over Rome and the



Campagna, from the Apennines to the Alban hills, has given the name of Belvedere to this portion of the palace: the Hall of the Meleager (M); the Hall of Statues (S), at one end of which is the celebrated Ariadne; the Hall of Animals (A); the Hall of the Muses (Mu); the Rotondo (R); the Hall of the Greek Cross (C); the Egyptian Museum (Eg); and the entrance to the outer gardens (E), which brings us to the long gallery of the Library (L), enclosing the inner garden on the north as the Chiaramonti gallery encloses it on the south. Above this entrance hall is the Hall of the Biga; at the end of the garden is the Hemicycle of the Pigna (H), built by Bramante for Julius II. In this stands the great pine cone, eleven feet high, supposed to have formed the summit of Hadrian's Mausoleum. The quadrangle behind, between the Hemicycle and the Hall of Statues, is the Cortile or the Belvedere (C), also from the designs of Bramante, in the four corners of which stand the Belvedere Apollo (Ap), the Antinoüs (An), now generally admitted to be a Mercury, the Laocoön (La), and Canova's Boxers (Bo).

The Rotondo, Fig. 45, is sixty-one feet in diameter, and was built by Pius VI., from the designs of Michael Angelo Simonetti. The floor is formed of a mosaic pavement, found at Otricoli in 1780, representing Centaurs and Lapithæ in the border, with a head of Medusa in the centre. Around the whole are black and white mosaics found at Serofano, representing some of the adventures of Ulysses, and others of marine monsters found near the Baths of Caracalla. This hall was built to contain the great vase of red porphyry, more than fifteen feet across, found in the Baths of Titus, which stands in the centre. On either side of the entrance are the well-known colossal busts of Tragedy and Comedy, which stood at the entrance to the theatre in Hadrian's Tusculan Villa. Opposite is a seated statue of Nerva, crowned with a bronze wreath of oak leaves. Of the other statues the first on the left is a Juno Lanuvina, armed and wearing the ægis; the second, the famous Barberini Juno; the third, beyond the Nerva, a Ceres, from the Theatre of Pompey; and the fourth, a Muse, in place of which now stands the bronze Hercules, discovered in Rome in 1864, and purchased by the late Pope for $50,000. The five niches shown in the plate occupy half the circumference, the other half being taken up with three similar niches and two doorways.

Fig. 50 shows the Hall of the Biga, built after the designs of Camporesi. The two-horse chariot from which it takes its name formerly stood in the Temple of the Sun. The wheels and pole are modern, the body of the vehicle having long been used in the church of St. Mark at Rome, as an episcopal throne. The horses also are modern, except the body of the right one.

The statue in the niche on the right is of Greek marble, and represents a Pontifex Maximus, or high priest, veiled, with a vessel in his hand, in the act of offering a sacrifice; on his right is an Apollo Cytharœdus, playing upon a harp. It has for a pedestal an altar adorned with female figures, sacrificing; on the other side is a statue of Alcibiades, found upon the Cœlian. In the niche on the left is the figure of a philosopher holding a scroll, supposed to represent Sextus of Chæronea, the uncle of Plutarch; on his left is an Auriga, or charioteer, in costume, with the palm of victory in his right hand, and in his left the fragment of the reins, which he has already cut with the curved knife that hangs at his belt. Nearer the front of the

picture is the Apollo Sauroctonus, or Lizard Slayer, now in the Hall of Statues, a marble copy of the celebrated bronze of Praxiteles. In the niche at the back of the room is a statue sometimes called Phocion, sometimes Epaminondas; on either side are ancient copies of the well-known Discobuli, or Quoit Players, of Myron and Naucydes. Through the window is seen the dome of St. Peter's.

Fig. 51 shows the Hall of the Vase, with the Hall of the Meleager beyond, and on the left the Cortile of the Belvedere. In the centre of the room is the large basin of Pavonazzetto marble, nearly six feet across, from which it takes its name. The three square niches on the sides of the room are filled with fragments of sculpture, apparently Greek. The drapery of the one on the right was much admired and studied by Raffaelle. Above the further niche is a bas-relief representing Cupid and Psyche before Pluto and Proserpine.

The Hall of the Bigæ is about thirty feet across, and that of the Vase about twenty.

HOUSE NO. 1437 WALNUT STREET, PHILADELPHIA, PENN. MR. T. P. CHANDLER, ARCHITECT.

LONGITUDINAL SECTION THROUGH ST. PAUL'S CATHEDRAL, LONDON.

In order that our readers may appreciate the importance of the decorations of the dome, of which we speak elsewhere, we here reproduce from Gailhabaud's "Ancient and Modern Architecture" a section of the cathedral taken longitudinally. The decorations here shown so sketchily represent the scenes from the life of St. Paul, painted by Sir James Thornhill, which have been destroyed by the smoke and damp of the London atmosphere. The inner dome is of brick-work, two bricks in thickness, and having in every five feet of rise a course of headers eighteen inches long, which bond the work together. The outer dome is, as is well known, supported on a brick cone, whose wall is eighteen inches thick, and which, moreover, is the direct support of the lantern, said to weigh seven and one half tons. The inner dome was built on a centering which rested upon the projecting cornice at its springing, and was left in position for the use of the painter, who was paid only forty shillings per yard for his work. The difficulty and cost of erecting the necessary scaffolding for any new decoration has been no inconsiderable deterrent to the undertaking.

THE SEWAGE SYSTEM OF PARIS. II.

The normal distances between the underside of the masonry and the street levels are as follows for the different types, except No. 1:

	Ft.	In.
Type No. 3	16	$0\frac{3}{4}$
" No. 5	15	$10\frac{1}{16}$
" No. 6	13	$6\frac{7}{16}$

The gallery under the Boulevard Sebastopol may be taken as a type of one of the branch collectors. It was constructed between 1850 and 1858 under one of the side avenues of the boulevard from the Boulevard St. Denis to the Quai de la Mégisserie; from this point it extends with type section No. 6 under the Boulevard de Strasbourg, as far as the Rue du Château d'Eau. In ordinary work this gallery serves as a collector for the flat district known as the Marais; during heavy rains it discharges the overflow direct into the Seine, and renders impossible the floods which used to be common in the Faubourgs St. Martin, St. Denis, Montmartre, etc. In this gallery are laid the two great water mains which receive their supply from the Ourcq. The following are the principal dimensions of the gallery:—

	Ft.	In.
Length	5074	0
Width at springing of arch	16	$0\frac{1}{4}$
Height from sidewalks to top of arch	11	$1\frac{5}{8}$
Width of side walks	2	$7\frac{5}{8}$
Width of channel	3	$11\frac{1}{2}$
Depth " "	4	$3\frac{9}{16}$
Height of side walls	3	$11\frac{1}{2}$
Thickness of arch at crown	1	$7\frac{11}{16}$
" " " springing	2	$11\frac{7}{16}$
Thickness of cement lining	0	$1\frac{3}{10}$
Distance apart of ventilators	164	0
Distance of street connections	328	0
Height of branch to street traps	6	6
Width " " " "	2	$7\frac{1}{2}$

The edges of the sidewalks of this gallery, as well as of all except the largest sections, are furnished with rails, along which the wagons run which are employed for cleaning out the channels. These wagons consist of a light frame running on wheels and furnished with a movable dam turning on an axis in the wagon, and being manipulated by a winch. Its form corresponds to that of the channel. When it is desired to remove any obstruction in the channel the dam is lowered, backing up the water behind, which being suddenly released carries with it the accumulation of sand, mud, etc. For the larger sections, boats are employed instead of the wagons. These are built of iron, and carry a movable dam in front similar to that attached to the wagons. Projecting from the boat are two arms carrying guiding wheels, which pressing against the sides of the channel keep the boat in the centre. When the dam is lowered the water behind it forms a head of from 6 inches to 12 inches, which is sufficient to produce the desired effect. The deposits accumulating below would quickly form a bank that would stop the progress of the boat, if the water in escaping through the spaces between the sides of the dam and the channel, and by small openings made in the former, did not drive the sand and mud constantly in advance of the boat. The rate of progress is very slow, as it takes from eight to ten days to traverse the five miles of the grand collector. In returning up stream movable dams are placed in the channel about every 600 yards, to reduce the speed of the current. Safety chambers for the workmen are placed at intervals of 650 feet. This precaution is very necessary, since in periods of heavy rains the collectors are quickly flooded, as, for instance, on the 27th of July, 1872, when in five minutes the Sébastopol collector was filled to the roof, and several workmen were drowned. There are about 7,000 points of egress for the workmen in case of necessity. The number of men employed in cleansing the sewers is about 700.

By means of the collectors nearly all the sewage water is discharged into the Seine far beyond the limits of the city. But this is done at the expense of the river lower down, chiefly on account of the great deposits of material held in suspension, since, as we have seen, the house sewage proper is not admitted into the collectors, but is removed from the cesspools by carts. Dredging operations are constantly necessary, and about 120,000 tons of *débris* are removed annually from the Seine, at a cost of some £6,000. To obviate this evil, sewage utilization works have been established for some years on a comparatively small scale at Gennevilliers, and larger ones are now in contemplation.

A commission was lately appointed by the Prefecture of the Seine to examine into a project for the construction of irrigation canals which should take the sewage water from the collectors and distribute it upon suitable land in the vicinity of Paris, with the object of improving the soil and also to convert the impure waters into an effluent that might filter gradually into the Seine. It will be observed that this project is an extension of the sewage utilization scheme already carried on at Gennevilliers. The new project includes the construction of a main irrigation canal extending from Clichy to the Forest of St. Germain, of six secondary branches, and of a large number of channels which collectively should irrigate an area of 10,000 acres.

The total length of the principal channel would be about 18,000 yards. It would be circular in section, 6 feet 6 inches in diameter, and would traverse the Seine three times by cast-iron siphons. The pumping station would comprise five engines, collectively of 1,200 horse power, of which two are already at work in pumping the sewage for the Gennevilliers irrigation. The estimated cost for these works is £160,000 for the pumping station and irrigation canal, etc., £40,000 for the secondary branches, or £200,000 for all, not including the outlay made at Gennevilliers, which has reached about £65,000.

The sewage utilization works at Gennevilliers were commenced in 1869 upon 14½ acres of ground, and have gradually developed until at the present time about 600 acres are under treatment. This land receives about 300,000 cubic feet of water per acre per year. The use of this water is quite optional, no cultivator is obliged to take it, and each may use what quantity he wishes, and apply it in whatever way he judges best. There are no data indicating the quantity taken by each farmer, so that only the average results are known.

The irrigated soil is generally laid in ridges separated by trenches; the trenches receive the water, and the ridges are reserved for the plants. The vegetable crops are here in advance of all others, but a number of fields are occupied by potatoes, beet-root, cereals, lucerne, etc. When it is desired to have the soil less broken, it is intersected by small trenches only, generally parallel, and placed about 9 feet apart. The general appearance of the crops is most satisfactory. The vegetables, the quality of which has been much criticised, are excellent. The Horticultural Society of Paris, which has followed with the greatest interest the development of the sewage farm at Gennevilliers, has spoken of the success obtained in numerous reports. At the bottom of the open channels by which the sewage is distributed there is a blackish deposit, formed by substances held in suspension, mineral and organic. At the moment of its formation this deposit seems impermeable; but after having been exposed some time to the air it has the appearance of a felt composed of hairs and vegetables and other *débris*. This deposit is left at the bottom of the trenches during one crop, and is afterwards worked into the ground. Stony ground, of which there is a considerable quantity in Gennevilliers, is much improved by the deposits of insoluble matters, mineral and organic, which the sewage waters leave on its surface, and the amount of fertile soil is thus gradually increasing from year to year.

The scheme for the extension of the sewage utilization as elaborated by the late M. Belgrand is as follows:—

At present two 400 horse power engines raise part of the sewage water from the collector at Asnières. Two other engines, established near the first pair, would be sufficient to pump the rest of the sewage. The invert of the St. Denis is at a much higher level, and could be discharged in the plain of Gennevilliers by gravity. From the pumping-station at Clichy to the forest of St. Germain, for a length of 15 kilometers, the water would be pumped through a main; this conduit would pass by the plain of Colombes, across the Seine,

in a siphon, at the Island of Marante, would go through Bezons, Houilles, Sartrouville, then a second time over the Seine, and would enter the northern portion of the forest of St. Germain, where there are 3,750 acres of sterile ground, which irrigation would fertilize; afterwards the water may be sent in a channel to Achères, where the irrigation would be extended over 1,000 acres. The irrigable surfaces are approximately as follows: —

	Acres.
District of Gennevilliers	2,500 to 3,000
District of Nanterre, Colombes, Reuil	2,500 to 3,500
Districts of Carrières, Bezons, Argenteuil, Sartrouville	3,500
Forest of St. Germain	3,700
District of Achères	1,750

The largest of these territories, that of the forest, would be at the disposal of the municipal service, and would constitute an immense regulator over which the waters would run, and by which irrigation of the other districts might be controlled. For this reason this large area constitutes one of the chief advantages of the scheme. — *Engineering.*

CORRESPONDENCE.

THE NARROWNESS OF CITY HOUSE FRONTS AND THE ABUSES THAT HAVE ARISEN IN THEIR TREATMENT.

BOSTON.

RETURNING to town after some weeks spent in a New England country town of the best class, where the houses are all mansions, square, broad, and generous, befitting the broad valley in which they lie, I am struck, as often before, with the narrowness and petty subdivision of the street architecture of the city, where, with tenfold cost and ambition, the result is so much less in respect of dignity, repose, and refinement. The complaint is perhaps a foolish one, but it seems to me there is a needless smallness and fussiness in our city dwellings. We cannot, it is true, expect to plant the country mansion in city streets, and we cannot, with our inexhaustible taste for individual homes, emulate, except here and there, the broad façades of Continental cities. The subdivision is, I fear, unavoidable. But there are certain respects in which the American cities do needlessly belittle themselves, and cast behind them the opportunities which are offered for good building, and one respect at least in which this is especially true of Boston. Here the admirable but preposterously over-worked bay-window is responsible for much of the narrowness of which I complain. The bay-windowed front is the natural outgrowth of the "swell front," so called, of the last generation, a feature long characteristic of Boston houses, and almost unknown elsewhere. The modern development of it is no improvement. A front of twenty-five feet, more or less, has five vertical divisions, crowded with four rows of windows. Repose is impossible in such a composition, but as if to express our contempt for a quality so un-American we commonly load these windows with the attributes which belong to Italian architecture in the broad, unbroken walls of Rome or Florence. Heavy projecting cornices are jerked round these frequent angles, only to be brought up hard and fast at either end against that new feature, — the most frightful, perhaps, ever invented by modern utility, — the corbel of the fire-wall. Modern style requires the entrance door to this little front to be as wide and high as the doorway of a palace, and to be approached by a flight of imposing and massive steps, which generally occupy a third of the width of the lot. Enough more is consumed by the passage to the basement door to take up a full half of the frontage by the entrances alone, leaving the other half for a scanty pinch of green *turf*, which is commonly fenced by a stone balustrade massive enough for a park wall. Taken altogether, I am inclined to think this type of city dwelling the most pretentious and the least respectable which has ever appeared. Repeated as it is once in every twenty-five feet, or oftener, through nearly all the newer streets of the city, each house differing from its neighbor on either side in material, design, and height of stories, and agreeing only in the perpetual squirm of its front line, so that in the perspective of the long streets we can rarely find a horizontal line more than six or eight feet long, the complacency with which we regard this surprising creation, the steadiness with which we go on reproducing it, and the fondness with which we lavish upon it every decoration known to ancient or modern art make it one of the architectural wonders of the day.

Such as it is, however, it has made good its title to supremacy. I am not foolish enough to suppose that the belief of the resident of the Back Bay in his bay-window could be shaken by any argument which the united profession (if it ever could be imagined united) could address to him. It will continue to increase and multiply, and the only remark I am moved to make further concerning it is this: Let us learn to treat it simply, — seeing that to load its miserable little faces with architectural features which require space and elbow-room for their due effect is wasteful and ridiculous excess. Let us gradually reduce the projection of the bay, and thus mitigate the violence of the frequent changes in the direction of the lines. Let us try, by all means, to induce our clients to consent to stop the bay below the main cornice, so that the cornice itself and the roof may be straight, and that there may be so much at least to redeem the general uneasiness of the design.

One thing more. We know not whether it is reasonable to expect that many more houses will be built in Boston. Dismal prophecies begin to be heard of the end of the good things which in past days have fallen to our share. But there are sanguine persons who believe that the present hard times will have an end, and that there shall yet again be cakes and ale. We know, at least, that there is a hundred-acre park preparing among the outlying swamps, and that miles of new streets will be laid out to surround this pleasure-ground, upon which the prosperous citizens of future generations, and perhaps even of this generation of which we are, will be asked to purchase house-lots and build themselves houses. Must these new streets all be divided up into the everlasting twenty-five foot lots, and sold at two to five dollars the foot? Is there any warrant in the ratio of increase in the population or wealth of Boston for continuing in these suburban regions the condition of things which prevails in the city streets? It seems to me that not only from the picturesque and artistic, but also from the financial and speculative point of view it would be for the advantage of buyer and seller alike that the broad avenues which are to surround the new park should be made properly suburban avenues, and should be divided into lots of say a hundred feet frontage, and sold at reasonable prices which would encourage the building of generously planned houses with gardens about them. We can all remember such streets, generally it is true in the smaller cities, — Portland, Springfield, Providence, Syracuse, Cleveland, — where, though the houses may not be particularly attractive architecturally, yet they are made eminently so by their surroundings of green grass and trees and flowers. Such streets afford opportunities, which the close-built streets of the city deny, to the architect, the passer-by, and most of all to the fortunate dwellers, and they contribute, perhaps more than we are aware, to the encouragement of an elevated and refined taste among all classes of people. A.

A MINING ACCIDENT IN NEVADA.

THE Virginia City *Enterprise* of July 13th gives the following interesting description of an accident at the Ward Mine: —

The Ward Mine was yesterday the scene of a great deal of excitement and some four hours of suspense that to many persons was torture almost equal to that of the rack. About eleven o'clock, as the tank which is used in bailing water from the shaft was being hoisted to the surface, the engineer on duty, by some mischance, allowed it to be run up into the sheave. The tank, which is of six hundred gallons capacity, was full of water, and when it struck the sheave the clevis by means of which it was fastened to the steel wire cable was broken. The tank was of wood and ran on guides, the same as a cage. It was a big, clumsy, water-soaked affair, and very heavy, to say nothing of the water it contained. When it parted from the cable it went down the shaft like a leaden plummet, a distance of thirteen hundred and fifty feet to the water at the bottom.

When he saw what had happened the engineer was almost wild with excitement, as he knew that seven men were somewhere at the bottom of the shaft, and could not hope that all had escaped with their lives. He ran out of the works and shouted for assistance till his voice was heard at a great distance.

The hoisting tank fell down the south compartment. The next compartment north is the one in which the cage is used. The cage was down at the time the tank fell. The first move was the attempt to hoist this cage to the surface. A move was made to do this, but no sooner had the cage been started than a signal came up from below to stop. This showed those on the surface that there were some men below who were alive. The men below then struck twenty bells. No one above knew what this meant, though it is now said that this is the Cornish death signal. Not knowing what to do those above again tried to hoist the cage, when sharp and unmistakable came the signal to stop. Again came up the twenty bells. These were followed by other signals that could not be understood. Several times it was thought that those below might be ready to have the cage hoisted, and careful attempts were made to move it up, but each time came up from below the peremptory "Stop!" All this was exceedingly perplexing and ominous. It was finally concluded that some one was wedged in between the cage and the timbers of the compartment, and no further attempt at hoisting was made.

As the news of the accident spread, people came from all directions and crowded into the works. Among these were the wives and children of some of the men who were in the shaft, and the friends and relatives of others. How many men were killed, and who they were, were questions that were torturing all present.

As the cage could not be moved, an attempt was made to communicate with the men and learn something of the situation at the bottom of the shaft. By direction of Superintendent Thayer a rope was lowered, to which were attached two lanterns, a bit of board, and a pencil, so that those uninjured below might make their wants known. After allowing it to remain a few moments it was hauled up. One lantern was gone, the other extinguished, and it was clear that it had failed to reach its destination. This failure greatly increased the distress of those above. Although this effort at communication failed, repeated signals on the bell were struck by those below, but could not be understood.

What now seemed necessary to be done was to make a descent into the shaft. In order to allow this the cable attached to the cage

in the depths had to be anchored to the surface so securely that its entire weight would be sustained, and then detached from the reel. This was done and the cage put in place. As soon as all was ready — and it took hours of preparation to complete everything — John Oswell, foreman of the Julia and Ward, took two companions, tools, lanterns, etc., and started for the depths. The guides and timbers in the shaft had been so badly damaged by the descent of the tank that it took forty minutes for this cage to reach the bottom of the shaft.

It had been agreed upon between Superintendent Thayer and the foreman that if any men were dead he should, as soon as the cage reached the bottom, ring six bells, and then one for each death. When at last the cage stopped and no signal came up, the suspense of all at the surface was terrible. What to make of this silence of the bell no one knew. At last the bell began to strike and all present began to count. No death signal was sounded, but instead, clear and unmistakable, the signal to hoist.

As the cage came to the surface five men were seen on it, — the three who went down and two others, one of whom was supported by his comrades. The joy of all present was great when it was announced that the two men on the cage were the only ones hurt, not dangerously; that all left below were sound and well.

It was soon ascertained from the men that the lucky escape was owing to the fact that all the men in the bottom of the shaft were in the north compartment, out of the way of harm, except two. They were in the tank compartment, and must have been instantly killed had they not heard the tank coming down the shaft. They instantly dashed into the middle compartment, in which was the cage with a car upon it. They tumbled into and over the car and cage just in time to escape the falling tank, but were injured as above stated either by striking their heads against the timbers or the car, or by fragments of the tank.

When the cage struck the concussion was terrific. Every light was instantly extinguished. Mr. Rorbford says the concussion deafened him for a time. The reason the men below would not allow the cage to be hoisted was that they supposed it upheld a mass of timbers, or in some way protected them. They wanted their situation made no worse than it was.

NOTES AND CLIPPINGS.

Accident. — On August 2d the smoke stack of Shaffin and Miller's quilt factory, Brooklyn, fell through the roof of the building, and caused such a panic amongst the female operatives that four of them jumped from the second story windows, fortunately receiving but slight injuries.

Fall of a Piazza. — One of those unforeseen building accidents for which no one can be held responsible happened lately at Silver Lake, in Wyoming County, N. Y. The County Pioneer Association, numbering some twenty thousand persons, was holding its annual festival at the lake on Thursday, August 1st, and when during the afternoon a thunder-storm came up, the crowd rushed to the hotel and adjoining houses and sought shelter there. The piazza, which extends along the whole front of the building, was quickly crowded to its fullest capacity, and then, after a short resistance to the unexpected weight, about half the floor gave way, and dropped the struggling crowd to the ground, some twelve feet below. The panic caused by the accident was such that the crowd in an adjoining building, by its excited movements, caused the floor there to give way; but a billiard-table in the room below received the ends of the broken joists, and so formed an inclined plane over which the crowd slid in comparative safety. Other floors were strained, and partially gave way, and altogether the buildings appear to have been as badly wrecked as the crowd was rudely tumbled about.

The Candy Factory Explosion. — The remarkable statement is now made that one James Gresham had an office in Greenfield's factory on Barclay Street, New York, where he had specimens of a powerful explosive which he was manufacturing by a secret process for the exclusive use of the Russian government. The explosive, more powerful in its action than dynamite, is said to be made by treating powdered asphaltum with electricity. If there is any truth in the report, it is singular that the fact that there was such a destructive substance in the building has not transpired before.

Brick-Making by Steam. — Evidently there are in this country those who do not share Mr. Barry's belief that "iron is the building-material of the future," but have greater faith in the qualities of burned clay, and show their faith by their works. There has been established lately in Baltimore the second factory in the country for making bricks by steam, — the other establishment being in Washington, — which is said to be able to make two hundred thousand bricks each day. The clay, after it has been passed through iron rollers which pulverize the small stones and reject the large ones, is carried to the top of the building and thence falls into the disintegrator which makes four hundred and fifty revolutions per minute. Here it is reduced to a fine powder and passes off into a pipe where by the addition of steam it is moistened enough to give to its particles the proper coherentness. This pipe feeds a wheel furnished with moulds which, in the two revolutions it makes each minute, turn out two hundred and thirty-two bricks. As the wheel revolves the bricks drop out on to an endless belt which carries them to a shed some fifty feet away, where they are loaded by hand upon small cars, which are rolled into drying ovens and allowed to dry there during five hours, the dampness in these ovens being constantly withdrawn by an exhaust fan. After this they are stacked in kilns and fired.

Herculaneum and Pompeii. — Preparations are now making to celebrate at Pompeii next year the eighteen hundredth anniversary of the destruction of Pompeii and Herculaneum.

The Explosiveness of Flour Dust. — Professors Peck and Peckham, of the University of Minnesota, have been making an extensive series of experiments to determine the cause of the recent flour-mill explosion at Minneapolis. The substances tested were coarse and fine bran, material from stone ground wheat; wheat dust, from wheat dust-house; middlings, general mill dust, dust from middlings machines, dust from flour dust-house (from stones), and flour. When thrown in a body on a light, all these substances put the light out. Blown by a bellows into the air surrounding a gas flame, the following results were obtained: Coarse bran does not burn. Fine bran and flour dust burn quickly, with considerable blaze. Middlings burn quicker, but with less flame. All the other substances burn very quickly, very much like gunpowder. In all these cases there was a space around the flash where the dust was not thick enough to ignite from particle to particle; hence it remained in the air after the explosion. Flour dust, flour middlings, etc., when mixed with air, thick enough to ignite from particle to particle, and separated so that each particle is surrounded by air, will unite with the oxygen in the air, producing a gas at high temperature, which requires an additional space; hence the bursting. There is no gas which comes from flour or middlings that is an explosive; it is the direct combination with the air that produces gas, requiring additional space. Powerful electric sparks from the electric machine and from the Leyden jar were passed through the air filled with dust of the different kinds, but without an explosion in any case. A platinum wire kept at a white heat by a galvanic battery would not produce an explosion. The dust would collect upon it and char to black coals, but would not blaze nor explode. A piece of glowing charcoal, kept hot by the bellows, would not produce an explosion when surrounded by dust, but when fanned into a blaze the explosion followed. A common kerosene lantern, when surrounded by dust of all degrees of density, would not produce an explosion, but when the dust was blown into the bottom, through the globe and out of the top, it would ignite. To explode quickly the dust must be dry. Evidently when an explosion has been started in a volume of dusty air, loose flour may be blown into the air and made a source of danger. — *The Scientific American.*

The Sanitary Condition of Boston Houses. — During the past year the Massachusetts State Board of Health has caused to be investigated blocks of buildings in the following sections of the city of Boston: —

Section 1 — Beacon Hill, near the State House.
Section 2 — Back Bay, near the Public Garden.
Section 3 — South End, near Chester Park.
Section 4 — West End, near the Lowell Depot.
Section 5 — South Boston, between Eighth and Ninth streets.
Section 6 — Between Harrison Avenue and Albany Street.
Section 7 — South Boston, near Independence Square.
Section 8 — Monument Hill, Charlestown.
Section 9 — Northerly Hill, East Boston.

The object of the investigation was to determine their sanitary condition as regards (1) drains, (2) soil pipes, (3) traps, (4) air-boxes, (5) cellars, (6) yards, and the result is shown in the following tables: —

	Section								
	1.	2.	3.	4.	5.	6.	7.	8.	9.
Houses in the block	28	50	48	72	28	38	29	49	46
Houses examined	25	45	35	72	25	34	24	43	40
DRAINS.									
Houses with defective drains	4	14	26	47	23	20	3	26	30
Houses without defective drains	23	31	12	25	4	14	27	28	10
SOIL-PIPES.									
Houses with soil-pipe ventilated	2	13	–	–	–	–	–	–	–
Houses with soil-pipe not ventilated	24	20	34	10	20	8	24	38	21
No soil-pipe, vault used	–	–	1	62	6	26	–	11	19
TRAPS.									
Houses with traps	25	43	7	14	–	6	6	28	–
Houses effectively supplied	14	23	7	2	–	2	5	21	–
Houses without effective traps	13	20	28	70	29	32	19	28	40
AIR-BOXES.									
Number with passable location	18	45	20	–	–	–	18	11	–
Number with bad location	4	–	13	–	–	–	6	12	–
Houses without a furnace	4	–	2	72	26	34	–	28	40
CELLARS.									
Cellars found passably light, including basements which are used as cellars and kitchens	24	45	34	67	20	30	13	40	35
Found quite dark	1	–	1	5	5	4	11	4	5
Found damp or wet	1	3	2	27	18	23	9	22	11
Found clean	20	42	33	62	7	34	–	40	35
YARDS.									
Number of passably clean	24	45	35	64	24	29	24	47	38
Number of passably dry	25	46	35	71	26	30	24	48	40
The others were wet, or unclean.									

The Gilbert Scott Memorial. — It has been decided that the personal memorial, which it was voted should be placed in Westminster Abbey, shall take the form of a brass, which is to be placed over the grave in the Abbey nave. The task of designing the brass has been assigned to Mr. G. E. Street.

A Concrete Bridge. — The *Polytechnic Review* says that there is spanning an open cutting, through which passes one of the London railways, a bridge which in form is a flat arch of seventy-five feet span, and seven feet six inches rise in the centre, where the concrete is three and one half feet in thickness, increasing toward the haunches, which abut upon the concrete skew-backs. The material of which the bridge is made is formed of gravel and Portland cement, mixed in the proportions of six to one, carefully laid in mass upon close boarding set upon the centering and inclosed at the sides.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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CONTENTS.

SUMMARY:—
The Committee's Award in the Patent Office Competition.—The Congressional Investigation of the Labor Question.—The Difficulties in the Way of the Committee.—Dissatisfaction of the Real Workingmen.—The Labor Troubles at Washington.—The St. Louis Architectural Draughtsmen's Association.—The Effect of Urban Steam Heating on Trees.—The Washington Monument 53
ARCHITECTS AND ENGINEERS, I. 54
THE DETERIORATION OF OIL-PAINTINGS 55
THE ILLUSTRATIONS:—
Wood's Building, Wilkesbarre, Penn.—Country House near Cleveland, O.—Country House.—House on Brooklyn Heights, N. Y.—Design for a Church 57
CORRESPONDENCE:—
Letter from Paris 57
COMMUNICATIONS:—
A Contribution to Popular Ignorance on the Subject of Smoky Chimneys.—An Explanation in Regard to the Competitions in Interior Decoration.—The Size of American Bricks 58
THE STORY OF AN OLD BRIDGE 59
NOTES AND CLIPPINGS 60

THE expert committee of architects, chosen by the Secretary of the Interior to examine the competitive plans submitted for the restoration and reconstruction of the Patent Office Building at Washington, made their required report on the 9th instant. Thirteen competitors submitted 110 sheets, containing more than 294 drawings. The committee have decided that the contribution submitted, as afterwards discovered, by Mr. J. A. Vrydagh, of Terre Haute, Indiana, contained "the most intelligent embodiment of the requirements and suggestions" of the programme. This design proposed the erection of an additional story or "attic" upon the walls of the present building, so as to form an essential part of the architectural composition of the exterior, giving an entire new story of offices, seventy-two in number. All attempts made by the competitors to contrive, as suggested by the circulars of the Department, a new story which should be practically invisible from the streets, were found to result in such obvious imperfections of distribution in the plan, and to involve such serious inconveniences in respect to light, air, space, and circulation, that the alternative of a new story, as allowed by the Department, was considered the only practicable scheme. The committee also approved the arrangement of a central connecting passage across the court-yard of the building, as proposed by the successful competitor, or, instead of this, a rectangular building, seventy by seventy-five feet, in three stories, connected with the opposite wings by passageways, and containing eighteen offices. The committee recommended certain modifications of the scheme for the interior arrangements of the new Model Room, and approved the proposition of one competitor (S. C. in monogram) for "the restoration of the building substantially as it stood before the fire," but explained in detail its objections. The report seems to be exhaustive, impartial, and workmanlike. We hope to be able to present it in full in our next issue.

THE Congressional Committee appointed to collect evidence respecting the present depression in business and the consequent distress among laborers, with a view to ascertain causes and to suggest remedies, closed its first session on the 6th inst. and adjourned to the 20th. Up to this time the committee has had no reason to complain of paucity of testimony or of reticence on the part of its witnesses. Employers and employed, labor reformers, representatives of Workingmen's Unions, of Congresses of Humanity, of the Socialist Labor Party, of Associations of National Reform, have availed themselves of the ample opportunity of the occasion, and have been patiently heard. In the midst of the enormous mass of undigested theory and rubbish presented, most of which is familiar amongst the curiosities of political economy, the committee will have much ado, we imagine, to find the precious mustard-seed of knowledge. Up to this date, Daniel has not come to judgment. The notes of the committee are full of denunciations of the present order of civilization in every detail, and of complete and ready remedies for all the present evils. Among these remedies, socialistic and cooperative nostrums were abundant in every form: the establishment of government schools of mechanics, of elaborate systems of internal improvement for the employment of labor, the taxing of government lands, an unlimited inflation of the currency, restriction of the rights of patentees, systems of public loans to all applicants, compulsory curtailment of hours of labor, the abrogation of the contract system, direct employment of labor by government, the distribution of the public lands, the reëstablishment of the income tax,—out of such contradictory propositions as these, the committee can hardly hope to develop a rational and symmetrical system of reform. But having gathered such wisdom as it could from volunteer and promiscuous advisers, it now proposes, on reassembling, to hear only such persons as it specially invites to present their views concerning the variations in the prices of labor and of manufactured products, of the necessaries of life and rents, and the profits of manufacturers, during the past eighteen years. These witnesses are to be selected from among all classes of bankers, merchants, and manufacturers, from tradesmen and workingmen, and from all grades of employers and employed.

WHETHER the committee will find as ready response when it comes to the serious part of their work, the collection of trustworthy information as to "the causes of general business depression, especially of labor," and the searching out of measures of relief, remains to be seen. Experience shows that manufacturers are not fond of the trouble of furnishing statistical information as to the course of their business, still less as to their profits, and even statistics are seldom enough in themselves to explain causes or prescribe remedies. The means of relief suggested on the popular side of the question, it will be seen, all come in the end to some way of increasing taxation, or distributing other people's money by the aid of legislation. It is not our business to discuss questions in their purely political aspects; but we may be allowed to notice that these schemes are a pretty natural extension of the habit of special and class legislation, of which we have seen and heard much; and that, the principle being once fully recognized, it is only logical to carry it out and make like provision for the aid of ministers, lawyers, bank clerks, widows, orphans, architects, and what not. When this is fairly done, we shall not be far from the consummation desired by socialists,—a general distribution or "divvy," based on a hypothecation of all the immovable wealth of the country.

WE understand that the real workingmen complain that the committee is endeavoring to make the cause of labor ridiculous by permitting and perhaps encouraging all sorts of crazy theorists to appear before it and offer contradictory testimony. Apparently, however, the workingmen have no case against the committee, for they have had equal opportunity with the rest to detail their wants and explain their remedies; indeed, the records of the committee are not without a very small amount of honest and sensible evidence from the dissatisfied class. In Philadelphia it is proposed to hold workingmen's meetings, so that, by the cumulative force of many voices and by unanimity of complaint, the true state of the case may be more effectually set before the committee than by isolated statements. *Una voce poco fit.* Doubtless such gatherings will have their value; the committee can hardly shut its eyes and close its ears to them. But, unless they choose representatives to present their case to the committee of Congress in the appointed manner, to be questioned like other witnesses, we do not see how much good can be got out of them. Truth can be elicited only by such impartial processes as the committee seems disposed to make use of. If Kearney and his like have real grievances, let them ask for a hearing and state their case plainly, without the embellishments of rhetoric which befogs, or of blasphemy which betrays, the cause of truth. But the California phenomenon has already publicly denounced the committee. The new theory of the "pooling of issues" is not of a nature to bear cross-questioning before any committee, and will make no formal appearance in Mr. Hewitt's inquisition.

THE representative of the socialistic Guy Fawkes in Washington seems to be one Cohen, who, on the 5th inst., visited the District Commission at the head of a body of men claiming to be a

delegation from a mass-meeting of laboring men, and submitted a series of resolutions said to have been adopted at that meeting; these called upon the officers of the Government to fix eight hours for a day's work and $1.50 for the lowest payment therefor, and to require all contractors on public works to be placed under similar obligations with respect to their laborers. The laborers' demonstrations have been active enough to elicit from the Supervising Architect a card stating that no officer in the Treasury Department has power to fix in any way the prices of labor; that the contractors on public works in Washington find no difficulty in obtaining all the labor needed for $1.00 to $1.25 per day; that men who prefer to work for this price rather than lie idle and starve have a perfect right to do so, and should not be interfered with; and that delays in the work occasioned by violence and riot do more harm to the workmen than to the Government. These are fundamental principles in the employment of labor, but we hardly believe that Cohen and his fellows will take them to heart, or that they will lay their troubles before the Congressional Committee. Their methods are different, and their aim is not to discuss, but to compel acquiescence; not to adjust themselves to natural and inevitable conditions of living, but to create political parties, to have a larger share in the spoils, to overturn society and build up a new fabric in accordance with theories which are impracticable and ideas which are dreams. There will be agitation and more or less of disturbance, until labor shall have learned that its true leaders are not noisy demagogues, but men of virtue and temperance, as well as of power, — true citizens of the republic.

It is some months since we mentioned the formation of an Architectural Draughtsmen's Association in New York, of whose aims and purposes we knew little, but of whose successful organization and work we would gladly hear more. There must be in New York ample material for the formation of a good working society, whose proceedings can be of incalculable benefit to its members, and which may become, after the manner of the Architectural Association in London, of no inconsiderable weight in the profession, and may gather to itself, as has been done by its prototype, those members of the profession who are repelled from the existing organizations by personal or other considerations. It is one thing, however, to found such a society in a large metropolitan city, where all the conditions are favorable, and whither the peripatetic draughtsman so often turns his steps, thus bringing ever fresh recruits; while it is quite another to enter upon such an enterprise in an inland city, as has just been done at St. Louis, where we imagine the ranks of draughtsmen receive but few recruits in the course of the year, and these chiefly of indigenous growth and home training. The St. Louis Architectural Draughtsmen's Association will have, however, the whole field to itself, for as yet no chapter of the American Institute of Architects has been established there, so the new society may hope to acquire, in the course of time, the support and coöperation of those older members of the profession who are already members of the Institute, or who would become so if a chapter were established in the city. Unless too great reliance is placed on the activity and enthusiasm of a few members, Western pluck and enterprise will probably bring this, as other enterprises, into successful and well-ordered operation.

Before either the proposition of General Spinola or that of the New York Steam Heating Company has been accepted by the government of New York, it would be well to wait a little longer, in order that the results of the system of steam heating at Lockport may declare themselves a little more clearly. Unquestionably much may be said in favor of the economy, convenience, and adaptability of the system, but before leave is granted to introduce the Holly system into cities, and more particularly into such rural cities as Auburn, N. Y., and Springfield, Mass., which, we understand, have already voted to adopt this latest of modern improvements, it should be definitely known what effect it will have on trees and vegetation, whose hygienic and indeed civilizing influence on the dwellers in cities can hardly be overestimated. At the best, trees have small encouragement in cities. If they border a thoroughfare the air and water are effectually excluded from their roots by the pavement, the surrounding buildings cut them off from the sunlight, city foresters think it their duty to trim and amputate their limbs, and their development is stunted by the continual exposure and mutilation of their roots during the laying and repairing of gas pipes, water mains, and sewers, even if a leaky gas main does not so pollute the soil as to make vegetable life an impossibility. If they beautify a park their condition is bettered only in that they have more light and air, advantages which are offset by the chances of having impermeable asphalt pavement run over their roots, or street sweepings so heaped about them as to cause their death, as lately in Boston. If to these unfavorable conditions is to be added the warmth of even carefully protected steam pipes, which will cause the sap to start at every winter thaw, and will vaporize the last atom of moisture left by an August drought, our cities may finally be compelled to content themselves with such pastoral suggestions as may be furnished by tin palm-trees and tinsel vines, such as form the umbrageous retreats of the Jardin Mabille at Paris.

We learn from a despatch to the *World* that Colonel Casey of the Engineer Corps, Superintendent of Public Buildings and Grounds, has laid before the Washington Monument Commission a detailed report upon the condition of the structure. He proposes so to strengthen the foundations that they will be able to bear, not only a total height of four hundred and eighty-five feet, as heretofore contemplated, but an increase of height to five hundred and twenty-five feet, which, as we understand, is now favored by the Commission, in order that the obelisk may far outreach the loftiest structure yet erected by the hand of man. If the obelisk is to be continued at all, we trust that it may be stretched to the utmost, so that there may be no question on the point of its preëminence in respect to height. Under the act we understand that work upon the superstructure cannot be resumed without direct authority of Congress. The interests of art, which we endeavor to represent, are concerned to prevent the completion of this work in the manner indicated, as we have many times taken occasion to say: we trust, therefore, that no proper effort may be spared to inspire Congress with a due sense of the responsibility which it has assumed, and although the strengthening of the foundation, which is now to be begun, will furnish to the friends of the obelisk an additional argument for the completion of it, let us not cease to hope that civilization may yet have its effect upon this blank and meaningless pile, and give to it a new grace, an expression more appropriate to the great occasion, a significance more in accordance with our intelligence and culture.

ARCHITECTS AND ENGINEERS. I.

The separation of architects and engineers into two professions is quite a modern device. The engineer's profession is in fact a young and strong-minded daughter of the architect's, begotten of the modern tendency to the mechanical development of science and to the division of labor. Needlessly divided sympathies separate those whom the family relation and common interests ought to keep in close union. In older ages of the world the works of architecture and engineering were always the same. The engineer's duty was only a part of the architect's. It was not till the time of the Renaissance that the seeds of a future family separation were sown, when, as we have often been told of late, architecture began to be outwardly independent of construction. Then first architects were amateurs and *dilettanti*, artists merely, who looked at the art of building from without. This divorce between architecture and construction, which thoughtful architects have learned to regret, and over which writers on art have lately spent so much eloquence, was the type, itself unnecessary, of the division of work which had to come. Even then the two duties were united in one person. The great architects of the Renaissance were the great engineers and constructors, as well as the great painters and sculptors. But the two offices having once come to be distinct, everything was ready for the establishment of two independent practitioners, as soon as the increased complexity of modern requirements and the reach of modern science called for it, and it was easy for them to fall rapidly into disunion. The gap between the professions has widened, till in our day we have seen architects who are either innocently ignorant or superciliously disdainful of the whole theory of construction, and engineers who attempt the most imposing monuments without any concern for architectural teaching. Visconti, the architect of Napoleon's tomb in the Invalides, and the projector of the new Louvre, looked upon construction as a study beneath the attention of an architect. Sir Joseph Paxton and Captain Fowke built the Crystal Palace and the great hall at South Kensington with no idea of calling an architect into council.

The separation of duties has nevertheless become necessary, because nowadays there are constructions which call for greater scientific skill than architects have commonly time to acquire; while the transformation of architecture from an art of close traditions to one of historical and eclectic study has greatly increased the amount of special acquirement it demands; because there is a vast amount of constructive work going on which gives but the smallest occasion for architectural care; and, in a word, because the tendency of civilization sets irresistibly in the direction of a division of labor. But if the separation is necessary, the dissociation is not. It is purely gratuitous; we might almost call it factitious and perverse. There are no two classes of practitioners, except physicians and surgeons, — not even architects and sculptors, — whose work should bring them more constantly into consultation than architects and engineers. This is especially true of them in England and the United States, where the dissociation is greater than elsewhere; where architects are too ready to underrate constructive training, and engineers to look upon art as vanity and vexation of spirit. Apart from the loss of the benefits that might follow from association, the visible results of divergence are unfortunate on both hands. Each profession has lost something in quality by their disunion, which a reassociation might help it to recover. Architects bungle in their construction, and engineers make a mess of their designs. The architect, too, is apt to fail of the straightforward manliness which a clear constructive sense would give to his designing. The work of the one becomes fantastic or effeminate, and that of the other coarse, ugly, and brutal. In the good time when architecture and engineering were associated, as they had to be when they were united in the same practitioner, an important work was at once the best in construction and in art that it could be made. The domes of the Pantheon and St. Sophia, the vault and clerestory of Amiens, the cupolas of Florence and of St. Peter's, were triumphs alike in both respects. But now we find the United States strewn with bridges, lighthouses, and other structures that need not have been hideous, and with the *débris* of buildings that need not have tumbled down, if their designers had been both engineers and architects; or if the members of each profession would have taken good counsel from the other.

As things stand the engineers have rather the advantage before the public in our country at least; not because they do the architectural part of their work any better than architects do their constructing, but because their successes in their own field are more easily recognized, and their failures in their neighbors' less so; because, perhaps, they set a higher value on training than architects; because they are better united as a profession; because, in fine, the age they live in is more a scientific and mechanical age than an artistic one. On the other hand, inasmuch as architects depend more on construction than engineers on design, there are many architects who are trained constructors, while there are perhaps no engineers who are trained designers. There are architects — we can call to mind several in the United States — who have added to their studies a regular schooling in engineering, and these, other things being equal, should be the best equipped of their profession, but this is naturally the exception rather than the rule. The architect is under heavier penalties to guard his weakness, for his building, however well designed, may tumble down, bringing its beauty to naught and its author to disgrace; whereas the engineer's may still be useful, if it turns out hopelessly ugly. Neither profession can get along without the knowledge that belongs to the other. No one would trust, in these days, the architect who openly rejected constructive skill; and it is probably safe to say that the engineer does not exist who does not always, however utilitarian he may be, do something to make his constructions look well. There is, in truth, no sharp line to be drawn between the works of engineering and those of architecture. There are many buildings which may be classed with either, and are given to the practitioners of either, as convenience may require. There are others, such as mills, elevators, lighthouses, which are usually given to engineers, that, if they are to be given to one profession exclusively, might with advantage in some respects be turned over to architects. There are others which, by their monumental character, and by their difficulty of construction, call for the best powers of both professions. There are indeed persons who assume to practice both, calling themselves architects and engineers, which on the debatable ground is not unnatural; but it is safe to infer that they do not stand, or even aspire to stand, in the front rank of both professions, if of either.

Practising as they do the two branches of constructive art which ought to be at one, and can never be wholly separated, but which modern usage has necessarily and irrevocably assigned to different professions, architects and engineers, one would say, were natural allies. They ought to profit by constant consulting over common interests and analogous occupations. Each profession ought to be the most appreciative spectator of the other's work, to study to understand it, and to be first in leading the public to a sympathetic comprehension of it. Each should recognize the benefit of an appeal to the other for advice, in those parts of its work which trench on the ground of the other. Their professional relations, their legal standing and liabilities, are analogous. There is, therefore, much that they might do in common to establish reasonable and orderly rules of practice, and to strengthen the position of both before the public. Not that there is no recognition of brotherhood between the professions, with more or less consultation, and occasionally some concert of action; but there might with benefit be a good deal more, especially in our own country, where the two guilds have but lately succeeded in defining their own personality, as it were, and where whatever union there may be is perhaps as much in a confused identity as in the helpful intercourse of two well-distinguished professions.

Many ways naturally suggest themselves in which concert of action between the two bodies of men would be valuable. Of some of them, and of some means by which it might be furthered, we shall speak in another article. That any single class of men can in these days be thoroughly skilled both as architects and as engineers is not to be looked for. Since engineers exist, architects will do well to recognize and take advantage of their superiority in their own province. Engineers may remember that a skilful designer can add a grace to their most conspicuous works, which the public will value, if they do not. If there had been a habit of cooperation between them we might have escaped some such disasters as that of the Rockford Court-House; nor need we, in case the Brooklyn bridge remains unfinished, have seen its huge piers stand predominating over two cities in unnecessary ugliness, while unredeemed by any useful office.

THE DETERIORATION OF OIL-PAINTINGS.[1]

Oil-paintings are subject to various kinds of changes, which may be considered as diseases, requiring different treatment according to their different nature. A science needs to be formed, a pathology and therapeutics of oil-paintings. The pathology would have to describe and explain those diseases and their progress, and to develop the methods by which a correct diagnosis could be arrived at in each individual case. The therapeutics would teach the remedies which might be applied either to cure or to alleviate the disease, or at least to stop its progress. A hygiene would follow, which would have to teach how to avoid pernicious influences, and which, besides, while giving precepts for the technical process of painting, would have to forestall those constitutional diseases, which, even in cases where no noxious influences can be traced, are the causes of decay, after a comparatively short period of existence. As medical science is above all things based on anatomy and physiology, so the exact knowledge of the structure of a picture would have to be acquired previously to any study of its disease. Unfortunately, direct investigation alone can procure no such exact knowledge; on the contrary, we are obliged to enter upon a minute historical investigation of the material as well as of the technical methods adopted by artists of different schools and different periods.

The excellent works of Cennino Cennini, Mérimée, Sir Charles Eastlake, Mrs. Merrifield, and others have already furnished most valuable material; but still the field for investigation remains unlimited; for, in order to enable us to secure the conservation of each valuable painting, we ought to know exactly how it was made. The artists of the present time would spare infinite trouble to the investigators of future times, if, along with their works, they would leave the account of their practice in the case of each picture. A treatment without exact knowledge of the normal condition, as well as of the nature of the disease, is, as we shall see, as dangerous for the picture as it would be in the case of living beings.

Professional restorers of pictures admit this danger in a general way; each of them, however, is convinced that he himself, by his personal knowledge, skill, and care, knows how to avoid it. The public pays too little attention to the subject, and therefore it occurred to me that it might be useful to give a short account of what we know about this question, of the changes to which oil-paintings are exposed, as well as of the means either to avoid or to cure them.

We have to consider, first, the material on which the artist has painted; that is, as far as oil painting is concerned, principally wood

[1] A paper by Dr. R. Liebreich, read at the Royal Institution of Great Britain, and published in the *Architect*.

and canvas. Secondly, the priming; that is, the substance with which the surface was prepared in order to be made fit for painting. Thirdly, the painting itself; that is, the pigments and vehicles used for it, and the liquids that were added during the painting, the mediums, megilp, siccative, varnish, essential oils, etc. Fourthly, the coat or coats of varnish spread over the picture.

The wood on which a picture has been painted may either warp or get chinks in it, or become worm-eaten or even altogether rotten. Against warping the remedy usually applied is moisture. If the panel is very thick it is first made somewhat thinner; then the back is moistened, and the picture is left to lie on its back for twelve to twenty-four hours, after which time it will be found to have bent straight. Of course this must not be continued longer than necessary, otherwise the convex surface, instead of becoming plane, would become concave. When straight, the picture is kept so by beads, which have to be adapted in a particular way, a certain degree of shifting being allowed for the expansion and contraction of the wood. Cracks in the wood are drawn together by inserting pieces of wood of a special shape. Sublimate solutions are employed to destroy worms.

Trifling losses of substance are replaced by cement. Small portions of rotten wood, not extending too near the painting, are cut out and replaced by wedge-shaped pieces. If, however, the greater part, or the whole substance of the panel, is rotten, the picture must be separated from it and transferred to new wood, or rather to canvas. This was first tried by Hacquin, in Paris, and was performed successfully upon many pictures, and, among others, upon one of Raphael's Madonnas, in the Galerie du Louvre, and upon Sebastian del Piombo's Resurrection of Lazarus, now in the National Gallery. The process no longer appears so very marvellous; it is generally executed in the following way:—

First of all the surface of the picture is pasted over with gauze and paper; after that the wood is made straight by moistening, or, if necessary, by making incisions with the saw, into which cuneiform pieces of wood are driven. By means of a tenon-saw the panel is to be sawn into little squares, which must be removed by a chisel, and in this way the thickness of the wood is reduced to half an inch; it is then planed until it becomes no thicker than paper, and the rest is removed by means of a knife and with the fingers. The painting being thus severed from its basis, it can be fixed on canvas if the priming is sufficiently preserved. In the opposite case, a mixture made of chalk and glue, or something of the kind, must be put on first, and very evenly smoothed after being dry. This done, the new canvas has to be fixed upon it by means of a mixture of glue, varnish, and turpentine, and the substance of the picture pressed tightly and evenly against it by means of warm irons.

In order to avoid deterioration, the most minute precepts have been given for preparing the panel. It has to be taken from the best oak, or nut trees, or cedars. The wood is to be cut into boards during winter-time, and kept till autumn before being dried; it can then be prepared only in the following spring, etc. It would certainly be preferable to give up wood panels altogether for large pictures, and only to think of means to make the canvas stronger. For small pictures, panels offer certain advantages, and can be more easily preserved from decay.

In the canvas we meet with the results of injuries or spontaneous decay. A rent may be mended by rags of linen stuck at the back of the picture. Even a hole may be filled up by pieces taken from other decayed paintings. If the picture is considerably damaged, it will be best to line it. But if the whole canvas is rotten and tattered, it will be preferable to sacrifice it by pulling off the threads one by one, after having secured the painting itself by pasting paper on the front of it. This done, the painting is transferred to another canvas in the same way as those removed from wood.

There are different modes of priming, which may be brought under two principal heads, — the distemper and the oil priming.

(1.) The canvas is distempered by a mixture of chalk or plaster and paste, or glue, which may be laid on raw, unbleached canvas; or this latter may be beforehand prepared with glue or paste. Several coats of this mixture must be put on in succession, one being perfectly dry before the next can be applied. Many of the older oil paintings are painted on such ground. It has the advantage of being quicker prepared, of absorbing the excess of oil, of permitting the color to enter into the priming and to dry quicker, and, moreover, of containing a white absolutely innocuous to the other colors. The inconveniences, on the other hand, are that it more easily breaks, and under the influence of humidity separates from the canvas.

(2.) The oil priming consists of several coats of oil colors. As each of these must be perfectly dry before the next is laid on, and as, moreover, time must be given to the whole to dry completely before painting upon, in order to avoid the sinking in of the colors, the whole preparation is much slower than the distemper. Nevertheless, it is now generally adopted.

Rey, in France, has pointed out a process which is a compromise between the two methods; he begins by distempering, and after several coats of distemper, having dried one after the other, he puts on a coat of oil which, as it were, changes the distempered ground into an oil-color ground.

With oil priming it is of importance that the principal color be white lead, to which are added comparatively small quantities of yellow, black, or other colors. For a whole century a school — that of Bologna — predominated in Italy which abandoned this principle. During the second half of the seventeenth and the first half of the eighteenth century, most of the Italian masters of other schools followed its example. Probably for the purpose of obtaining more easily the desired effect of the chiaro-oscuro, they painted on a brownish-red priming, which consisted of bolus mixed with umber. Not one of those pictures has kept its original coloring. Not only has the priming caused all the dark parts to grow much darker, but it has destroyed, or nearly so, all the glazing, so that only those colors can be recognized which either contain white or are glazed on white. I can show you numerous instances of this, for, on account of the extreme fertility of this school, there is little difficulty in procuring pictures of masters of that time, or of their pupils.

Wood priming does not require the same elasticity as that of the canvas, which ought to be capable of being rolled. Therefore the priming of the wood shows less variations. It is generally composed of chalk or plaster, tempered with starch, paste, size, or glue, and more or less thickly laid on. In some pictures of different centuries we find, either between the wood and the priming or between the priming and the painting, canvas, and, exceptionally, even paper.

The diseases of the priming are not of a very complicated nature. They manifest themselves principally in three different ways: (1) by cracks in the priming itself; (2) by the severance of the priming from the painting; (3) by the severance of the priming from the wood or the canvas. The third disease is by far the most frequent, especially among pictures on canvas distempered with paste. If small pieces only are scaling off or blistering, they are fixed again to the ground by letting a solution of size pass between the detached part and the canvas, and pressing both gently together. If the deterioration extends over a considerable surface, the picture has to be lined. While this is being done, and while the gluing substance penetrates into the picture, the detached parts are pressed on again with slightly-heated irons. If the whole priming threatens to come off, it will be better to take the picture entirely from the panel or canvas, and to transfer it to a new canvas.

I shall show you examples illustrating the before-mentioned points, and among them two pictures, — one in oil, taken off from canvas, the other in tempera, taken off from wood. Both of them, strange to say, have escaped destruction without having been transferred to a new canvas, and without being covered with paper, as is usually done, before taking them off. They show you the painting by itself from both sides. I have of course used every precaution in bringing them safely over from Florence, where I happened to discover them carefully stowed away among heaps of old pictures.

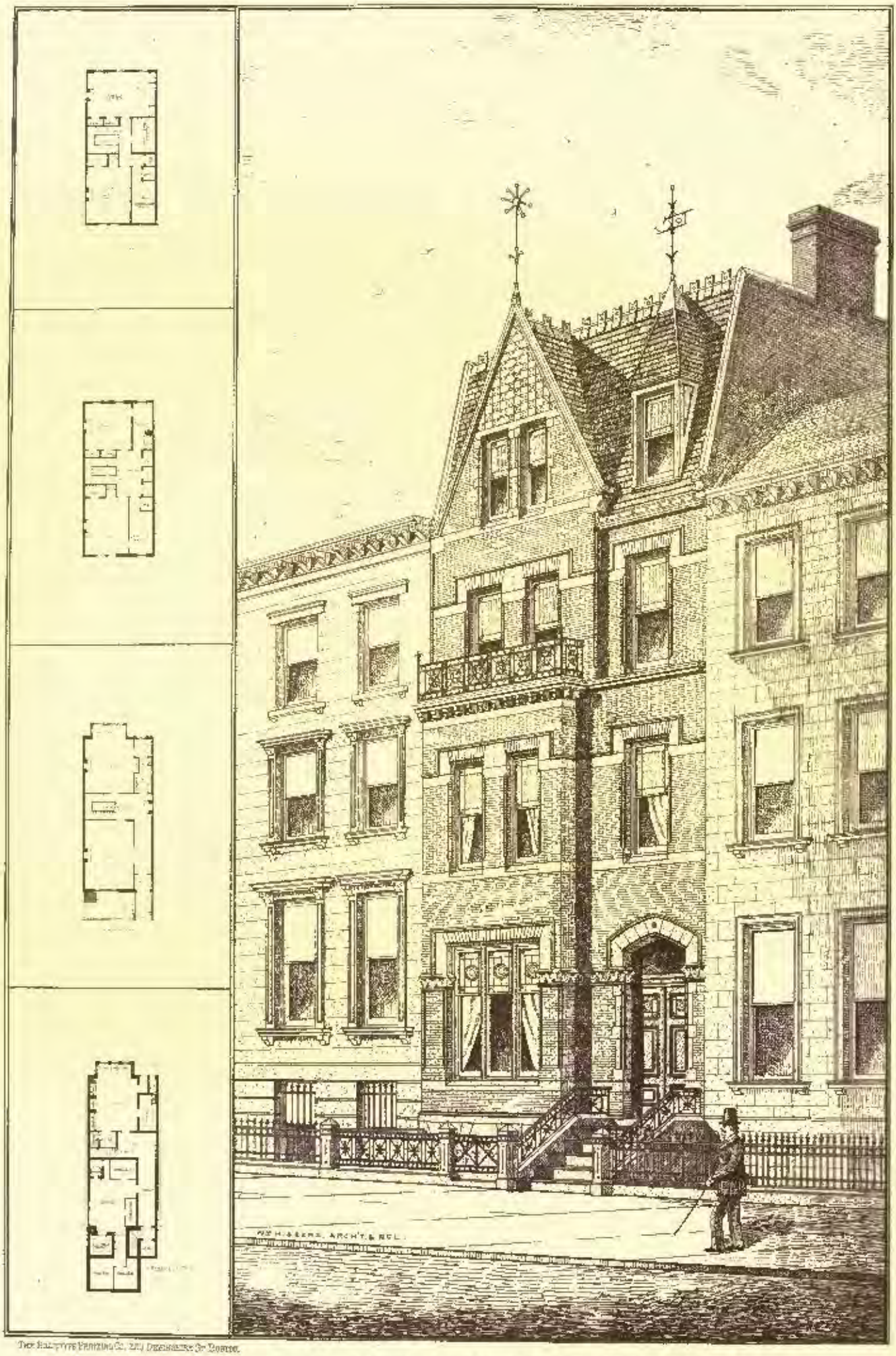
We come now to the most important part of the picture, — the painting itself. We meet very often with the idea that the old masters had been in possession of colors, that is, pigments, the knowledge of which has been lost, and that this accounts principally for the difference between the oil painting of the fifteenth and sixteenth centuries, on the one hand, and that of the eighteenth and nineteenth, on the other. But this is a great mistake. We know perfectly well the pigments used by the old masters; we possess the same, and a considerable number of new ones, good, as well as bad, in addition. In using the expression of good and bad, I am principally thinking of their durability. From this point of view the pigments can be placed under three headings: —

(1.) Those that are durable in themselves, and also agree well with the other pigments with which they have to be mixed. (2.) Such as when sufficiently isolated remain unaltered; but when in contact with certain other pigments change color, or alter the others, or produce a reciprocal modification. (3.) Those which are so little durable that, even when isolated from other pigments, the mere contact of the vehicle, the air, or the light makes them in time fade, darken, or disappear altogether.

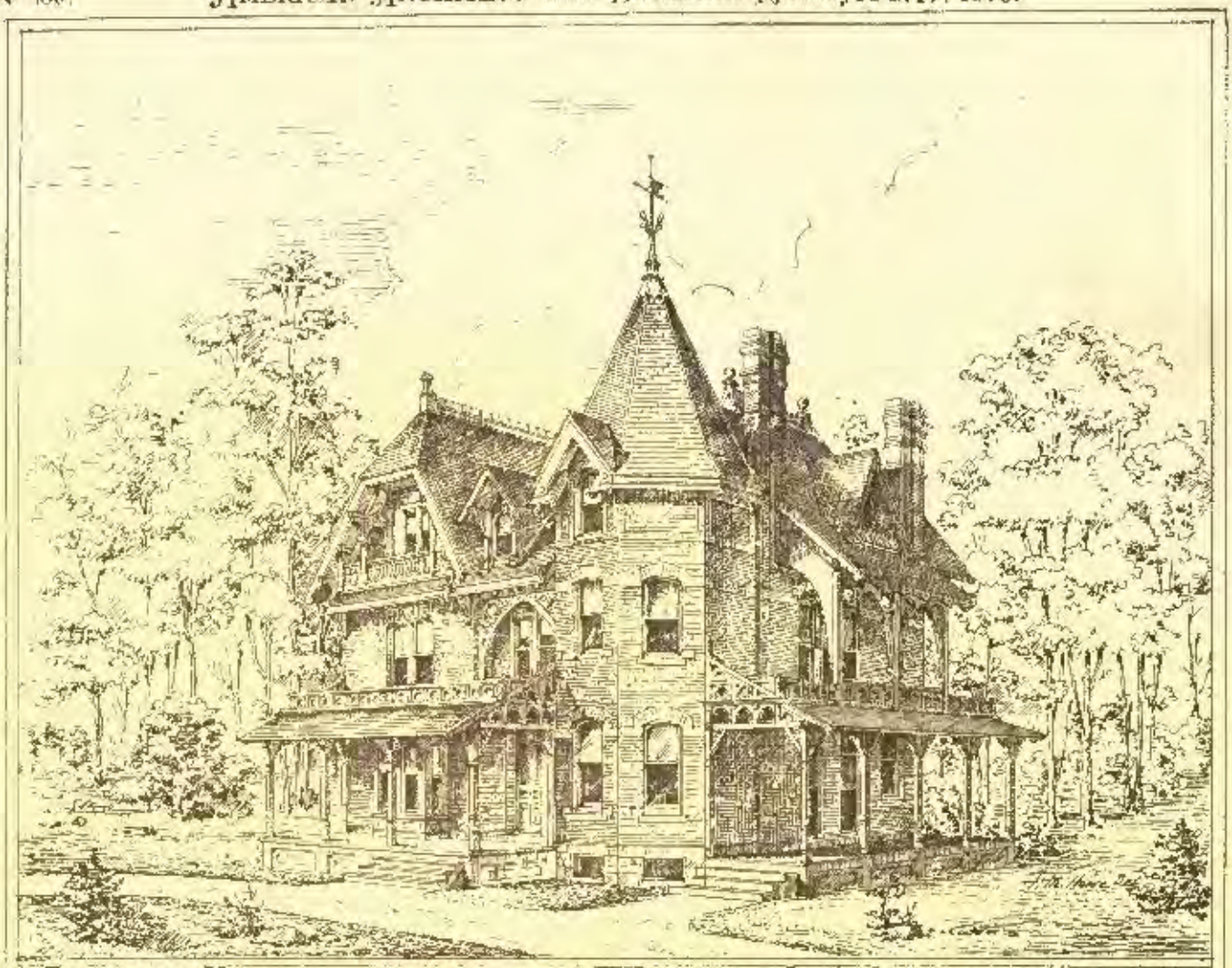
The old masters used, without reserve, only those belonging to the first of these three categories. For those belonging to the second they imposed on themselves certain limits and precautions. Those belonging to the third they did not use at all.

That some of the modern masters have not followed these principles is not owing to a lost secret, but to the fact that they disregarded those well-known principles, and even consciously acted against them. In Sir Joshua Reynolds's diary, for instance, we read that in order to produce certain tints of flesh he mixed orpiment, carmine-lake, and blue-black together. Now, orpiment is one of the colors of the second category, carmine-lake one of the third. That is to say, orpiment, as long as it remains isolated, keeps its brilliant yellow or reddish-orange color; but when mixed with white lead it decomposes, because it consists of sulphur and arsenic, and it, moreover, blackens the white lead, because the sulphur combines with it. Carmine-lake, even if left isolated, does not stand as an oil color, and therefore has been superseded by madder-lake.

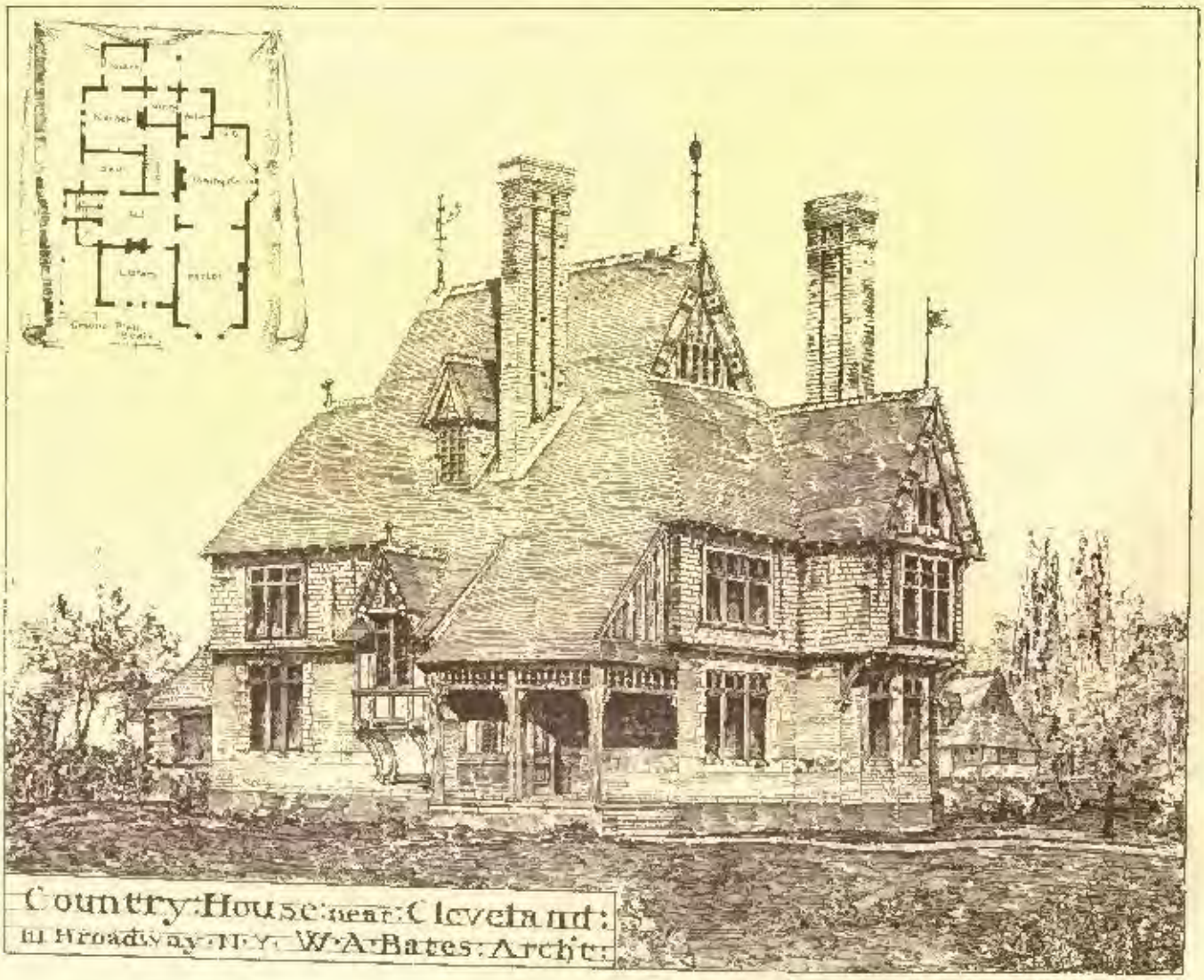
Unfortunately, some of the most brilliant colors are perishable to such a degree that they ought never to be used; yet it seems to me that just in one branch of art, in which of late remarkable progress has been made, — I mean landscape painting, — the artists, in order to obtain certain effects of color not easily to be realized, do not always resist the temptation to make use of a number of pigments, the non-durability of which is proved beyond doubt. However that may be, I think it pretty certain that the pigments in themselves play only a subordinate part in the deterioration of oil-paintings, and that the



HOUSE ON BROOKLYN HEIGHTS.
WM H BEERS, ARCHT 318 BWAY, N.Y.

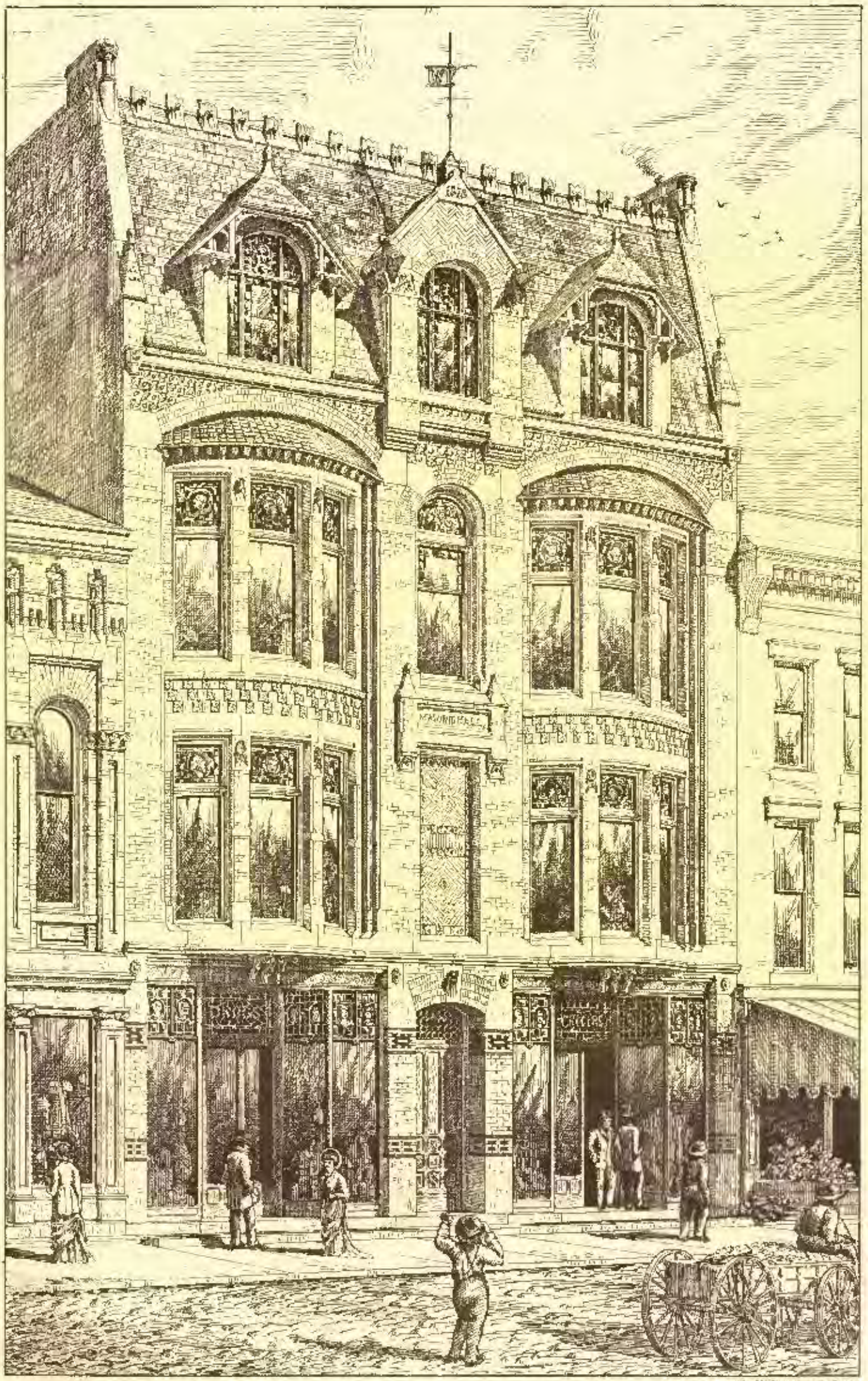


COUNTRY HOUSE A.B. JENNINGS ARCHT. 71 BROADWAY N.Y.



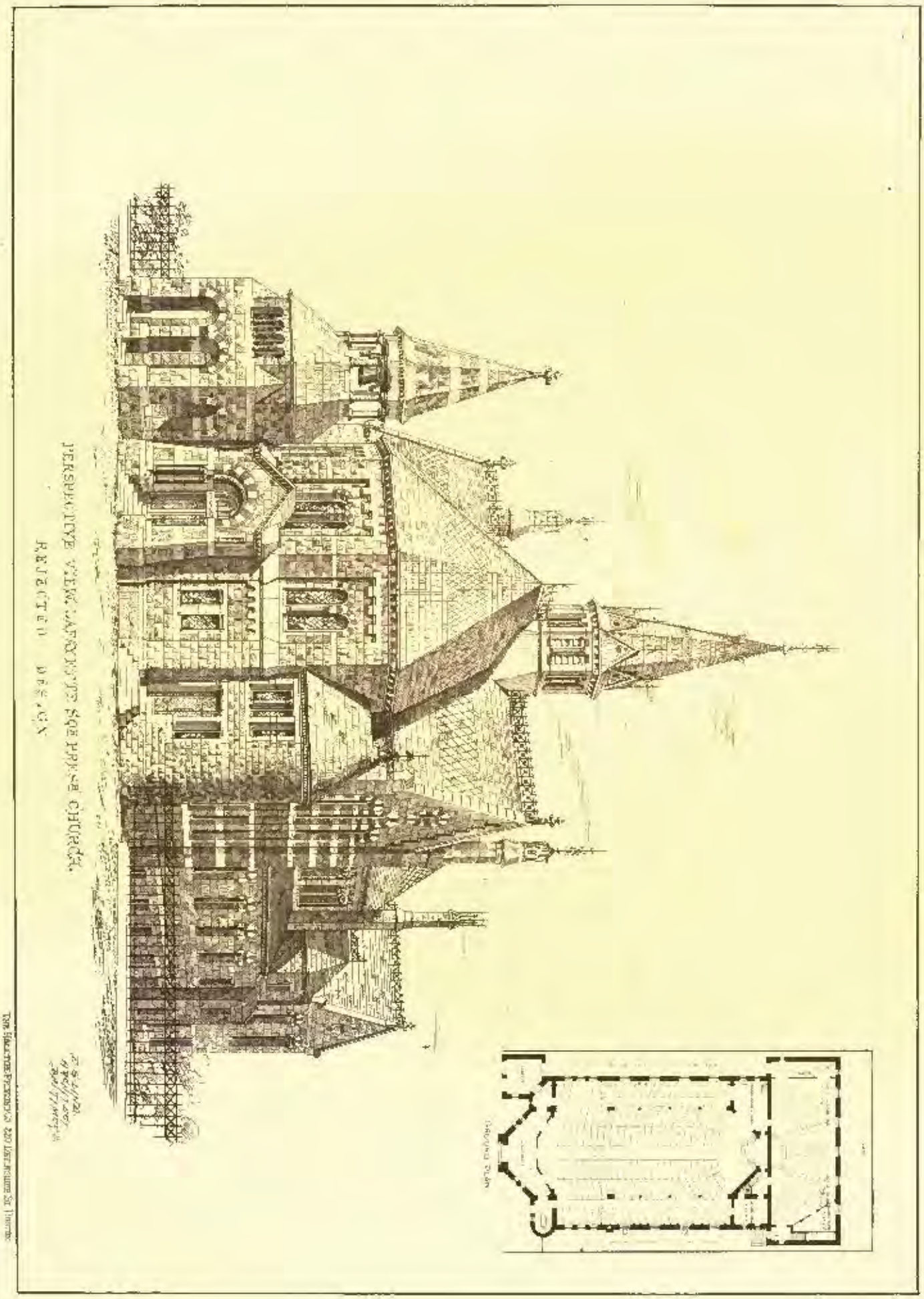
Country House near Cleveland:
11 Broadway N.Y. W.A. Bates: Archt:

The Heliotype Printing Co. 220 Devonshire St. Boston



Wood's Bldg Wilkes-Barre Pa.

Bruce Price, Archt.


PERSPECTIVE VIEW. LAFAYETTE SQ. PRESB. CHURCH.
REJECTED DESIGN

principal part belongs to the vehicle with which the colors are ground and to the liquids which are added during the painting. I hope, therefore, you will excuse my making some elementary explanations about these liquids.

Oil and fat are bodies consisting of carbon, hydrogen, and oxygen. They may be considered as salts in which glycerine, as a basis, is combined with different acids, — stearic acid, palmic acid, oleic acid. If oil is exposed to the air, it changes: certain kinds of oil remain liquid; others become thicker and darker, and are gradually transformed into hard and opaque bodies. The drying of oils is based upon a chemical process, during which the oil oxidizes by absorbing oxygen from the air, and combining a part of it with carbon to form carbonic acid, and another part with hydrogen to form water. The different oils dry with different rapidity, but this rapidity may be modified by the presence of certain substances, or by certain treatment. Linseed oil, for instance, according to the way in which it has been pressed out of the seed, contains more or less mucilaginous substances. These latter impede the drying of the oil, and have, therefore, to be removed by a refining process. If linseed oil in a shallow vessel is exposed to the air and light, especially to a green light, it soon begins to dry, and is transformed first into a kind of varnish, and gradually into a solid opaque substance. The drying may be quickened by boiling, and more particularly by the addition of lead, zinc, or manganese. In this way a quick drying oil varnish may be prepared and used as a siccative. It follows that there are certain substances which impede the drying of oils, and others which facilitate it. Amongst the pigments are some which belong to this category of bodies, — white lead, zinc-white, minium, vermilion, for instance, facilitate the drying; others, such as ivory-black, bitumen, madder-lake, will impede it. Supposing, now, we should add to each of the different pigments the same quantity of oil, the drying of it would progress at different rates. But in reality this difference is very greatly increased by the fact that the different pigments require very different quantities of oil, in order to be ground to the consistency requisite for painting.

Pettenkofer quotes the following figures, given to him by one of the color manufacturers: —

100 parts	(weight)	White lead	requires	12 parts of oil.	
"	"	Zinc-white	"	14	"
"	"	Green chromic	"	16	"
"	"	Chrome yellow	"	19	"
"	"	Vermilion	"	25	"
"	"	Light red	"	31	"
"	"	Madder-lake	"	62	"
"	"	Yellow ochre	"	66	"
"	"	Light ochre	"	72	"
"	"	Cassel's brown	"	75	"
"	"	Brown manganese	"	87	"
"	"	Terra verte	"	100	"
"	"	Parisian blue	"	104	"
"	"	Burnt terra verte	"	112	"
"	"	Berlin blue	"	114	"
"	"	Ivory-black	"	112	"
"	"	Cobalt	"	125	"
"	"	Florentine brown	"	150	"
"	"	Burnt terra sienna	"	181	
"	"	Raw terra sienna	"	240	"

According to this table 100 parts of the quick-drying white lead are ground with 12 parts of oil; and, on the other hand, the slow-drying ivory-black requires 112 parts of oil.

It is very important that artists should have an exact knowledge of these matters. But it seems to me that they are insufficiently known to most of them. All of course know perfectly how different the drying quality of different colors is. But that these different colors introduce into the picture so different a quantity of oil, and how large this quantity is in the colors they buy; and, further, that the oil, as well as the mediums or siccatives they add to dry the colors, is gradually transformed into a caoutchouc-like opaque substance, which envelops and darkens the pigments; and moreover that the oil undergoes, not in the beginning, but much later on, when it is already completely dry, changes of volume, and so impairs the continuity of the picture, all this is not sufficiently known. Otherwise, the custom of painting with the ordinary oil colors to be bought at any colorman's would not have been going on for nearly a hundred years in spite of all the clearly shown evil results, — results due, chiefly, to the principal enemy of oil-painting, that is to say, the oil.

That the masters of the fifteenth and sixteenth centuries did not use colors prepared in this way you may consider as absolutely certain; and if we hear the lost secret spoken of, and if we read that the pupils of the old masters had to pledge themselves to keep the secret, we may be sure that it is neither the method of painting nor the pigment used for it which is concerned in that secret, but exclusively the way of preparing the colors. The preparation was a very complicated one, varying with the different pigments; and we know that the pupils passed six years — that is, half of the apprenticeship — in grinding the colors for the master.

And therefore it is to this very point that every one who wishes to study the method of the old masters must first of all direct his attention. I, too, was led, by the study of this question, to analyze and restore old pictures. The possibility of making such analysis we owe to the relation between the old masters and their pupils. Of course we could not dissect or chemically analyze works of Titian or Raphael. But, fortunately, the pupils painted with the same material and by the same method as the masters, and thousands of pictures by the pupils, well preserved or in different stages of decay, may be easily procured.

I have myself, from among a very great number of such pictures, selected about one hundred specimens, part of which I have brought before you. As their artistic value is not, as you perceive, of the highest description, we need not feel any scruple in experimenting upon or even destroying them if we can thereby gain any valuable information.

THE ILLUSTRATIONS.

WOOD'S BUILDING, WILKESBARRE, PENN. MR. BRUCE PRICE, ARCHITECT, NEW YORK.

PHILADELPHIA pressed and moulded brick are used in the front of the building, which is relieved with finish of Wyoming blue stone and terra-cotta tiles. The roof is covered with red Vermont slate, and finished with terra-cotta cresting. The window heads and spandrels are filled with rolled cathedral quarrels.

DESIGN FOR A COUNTRY HOUSE NEAR CLEVELAND, OHIO. MR. W. A. BATES, ARCHITECT, NEW YORK.

COUNTRY HOUSE. MR. A. B. JENNINGS, ARCHITECT, NEW YORK.

HOUSE ON BROOKLYN HEIGHTS. MR. WILLIAM H. BEERS, ARCHITECT, NEW YORK.

This house will be commenced in September; the front will be built of Philadelphia face-brick, with moulded bricks on the angles of window jambs, etc.; the lower story to the height of water table, and all stone work, are to be of Connecticut sandstone.

REJECTED DESIGN FOR THE LAFAYETTE SQUARE PRESBYTERIAN CHURCH AT BALTIMORE, MD. MR. E. G. LIND, ARCHITECT.

This building, which was to be of green serpentine and drab Ohio stone, was intended to seat seven hundred persons. Its estimated cost, including school and lecture rooms at the rear, was $42,700.

CORRESPONDENCE.

THE EXHIBITION BUILDING IN THE CHAMP DE MARS. — GLASS AND IRON. — BRICK AND IRON.

PARIS.

NONE of the former great exhibitions have been of so direct an interest to the architect as the present one in Paris. The Palais du Trocadéro is unusually interesting, from its designer's eclecticism in boldly choosing from different styles the character which could best express his construction; yet a still deeper curiosity urges the visitor across the river. At the English Exhibition at Sydenham, in 1862, the architects watched to see what the engineers would do with their new building materials, glass and iron. It is now the turn of the engineers to examine what the architects have done towards appropriating a material they at first despaired of making artistic. Until now art has failed to overtake science in building; but the economy of mechanics is inexorable, and the designer must keep up or give up the struggle. The Champ de Mars will probably be the field of many a battle of this kind, but this year it seems as if art, by the aid of new allies, had regained her lead.

In the different annexes iron is employed with other materials in nearly every proportion: from the Pavilion of Public Works, which is of brick, with iron only at the angles, and for the gutter, roof, etc., used rather as a decorative material, to the main Exhibition building, which is essentially an iron structure. It is in the façade of the latter that terra-cotta and tiles, the allies of which I spoke, have been so judiciously introduced as to clothe agreeably with warmth and color the gaunt iron skeleton. These are used merely to fill the spaces between the iron beams; they are partly decorative, and there is no uncertainty, as too often happens with brick and iron, as to the functions of each material. The outlines of the building are probably well known from the illustrated journals, but the iron façade in reality gains from the skill with which the gardens in front are laid out. The Champ de Mars could not admit of a conspicuous terrace, yet the ground in front is sunk so that a low one is formed, which, broken here and there with steps and fountains, gives picturesque dignity to the vast structure behind. This matter of terraces, by the way, is hardly appreciated with us. In Europe — in Italy especially — they are at pains to form terraces both for the grandeur of public buildings and for the picturesqueness of dwellings, as a balustrade with statues or vases is decorative even when raised but a few steps. The central feature of the façade is a vast, projecting, yet deeply recessed arch, rising to twice the height of the adjoining galleries, and buttressed by two low corner staircase towers, which give access to a wide balcony within the arch, one third of its height up. These stairs and the balcony supports, as well as the great corner pavilions up to the springing of their domes, are of stone, — or rather artificial stone in cement, — and give solidity in appearance. The corner pavilions rise higher than the central one, and are crowned by four-sided domes, so largely penetrated by four huge semicircular windows as to be very light and airy.

In the galleries connecting these pavilions lies the chief artistic merit of the whole design. They have ten bays on each side, and are crowned by a high gutter ornament of deeply moulded iron relieved with red and gold. This harmonizes well with the brilliant color and bold design of the tiles encased in the square pillars which separate the bays, and are crowned with bronze figures supporting colored shields and flag-staffs. Against these pillars, under the shelter of a broad *marquise*, are colossal statues of the nations. They are

boldly designed by eminent sculptors, and look none the worse for being roughly done in plaster. The bays are filled with glass stamped in pale blue patterns, which looks well. In the interior of the vestibule there is little to praise beyond its airiness; the decoration is pretentious and coarse. The flat central dome and the segmental arch of the galleries are formed of slight iron ribs, filled in with vulgar plaster caissons painted in gold and metallic tints, so that the iron skeleton is quite lost sight of, and the whole becomes one heavy mass, — far too heavy for the slight side supports. A good commentary on this vestibule is found in its pendant at the rear. There, being less important, less was attempted, and the effect of the natural color of the plaster caissons encased in the iron web and painted a pale blue is good. An unfortunate idea of the architect, M. Hardy, was to make two flat niche heads to correspond with the great entrance arches in supporting the flat dome. In his hurry he was utterly unable to arrange the former, and they are left hanging over the entrance to the galleries like half saucers, while from without they look like the elbow-joints to a hydrant. The interiors of the end pavilions, with their vast semicircular windows forming simple penetrations in the dome, look better because nothing has been done; simply painted the roof explains itself, and is light and appropriate. Under these pavilions are, respectively, a colossal bronze statue of Charlemagne and a lofty wooden tower for the Canadian exhibition. The galleries are further filled with a fine display of the presents received by the Prince of Wales during his Indian tour, and now arranged in cases and Indian pagodas. Opposite these the government Sèvres and tapestry exhibition is badly shown off in a pretentious structure of wood imitating a stone portico. The entrance to these pavilions is under a *motif* as ugly as it is inexplicable. Imagine a niche head placed facing outwards, its corners resting on two iron pillars, while its back tunnels the building. The interior is brilliantly gilded, and I can imagine it used with some success to reflect an immense swinging lamp; but I fear this was not the original idea in view. To use a French expression, much in vogue in the *ateliers*, "It was an idea, — only it was a bad one." M. Hardy has done credit to his name by his audacious energy, which leads him to dare and do anything, and in the short time he has accomplished wonders, — sometimes of ugliness. It would be difficult to conceive anything more ugly than the two immense loggias which terminate the series of semi-detached fine-art galleries in the middle. Three gigantic round arches with domes are supposed to recall — but by what an effort of imagination! — the Loggia dei Lanzi at Florence. They look like some inner structure of masonry which is waiting to be treated architecturally; but there they stand quite completed. Their walls are covered with landscapes and colossal figures in tiles, principally from the manufactories of M. Deck and of M. Lochnitz. No art industry seems to be so much appreciated as faïence in its various forms, and many countries have superb exhibitions, which it would require volumes to discuss.

Separated from these unfortunate loggias by gardens, in the centre of the whole plan, stands the Pavilion of the City of Paris. From its size and character much was expected of it, as the last word in iron building. It has disappointed expectation, as perhaps was natural. Although originality was to be its charm, its very novelty disconcerts the public, and they have not given it what praise it really merits. It consists of a large rectangular hall flanked by iron porticoes; its end façades are of brick, rising over the entrance into a pediment, or, as the mouldings are almost without relief, I should rather say a gable crowned with a terra-cotta ornament. The entrance, closed at the top by a window, is surrounded by a brilliant band of tiles, slightly splayed inwards; and outside of this, again, a broad band of terra-cotta (plaster painted to imitation), with scroll foliage, is carried up and around the gable. Only the edges of the T-shaped iron uprights show as they rise to support the iron cornice. The iron is painted gray, picked out with deep blue. The whole is brilliant and original, but not altogether satisfactory; perhaps because the bricks are too pale in tone for the other colors, and, I think, because sufficient iron does not show to explain itself, as there is so much brick-work it seems superfluous. At least the square iron piers filled with terra-cotta work seem senseless at the corner of a solid brick wall. This same gable is repeated at the sides to receive the lateral porticoes. In designing the latter M. Bouvard has been entirely successful. They are charming. Delicate iron columns support a metal entablature and gutter. The high frieze is of plaster cast in graceful designs; the background delicately tinted, and dashed here and there with gilding. Painted canvas forms the ceiling, and contrasts well with the deep blue and green of the iron-work. The interior also is fine. Nothing could be more light and airy than the graceful iron columns, which rise some two metres from the wall to support delicate latticed trusses, such as M. Coquart designed for the covered court of the Ecole des Beaux-Arts. Almost the whole ceiling is occupied by five flat lights filled with ground glass in patterns. The coved surfaces are painted in buff and pale blue, and with the deep red of the walls produce a charming effect of color. The building exhibits admirably the artistic and scientific works lately carried out by the city.

I have already hinted at the Annex devoted to the Department of Public Works. It is also of iron and brick, or rather, I might say, of brick with iron finish. It is crowned by a revolving electric light, and its front is really covered by tiles in diaper patterns. In short, the building is a good example of the exaggerations to be avoided in using these three materials. Within are models of bridges, tunnels, harbors, and other public works of the government. There are also specimens of stones and building materials, with catalogues and much concise information for engineers. No less than seven hundred kinds of stones, one hundred and forty-one cements, and twenty-seven varieties of brick are catalogued. R.

A CONTRIBUTION TO POPULAR IGNORANCE ON THE SUBJECT OF SMOKY CHIMNEYS.

To the Editor of the American Architect:

Dear Sir, — Some four years since I made an addition to my house, containing two chimneys. About one of these I felt great doubt. It had one fire-place on the first floor, and directly above that were two rooms, the partition between them standing over the fire place below, and each room having a fire-place diagonally across the corner. Each fire-place has a dump flue. In order to support these diagonal fire-places it became necessary to corbel the brick-work very sharply through the one foot space afforded by the floor, to twist the dumps through this space, to work the flue in by the side of them and bring it up back of the diagonal fire-places, and then connect them with it, dividing the flues again above to let in a truss beam just under the third story fire-place, as a support for the partition above named. In short, it made a very crooked piece of brick-work, and I was hardly more pleased than surprised when, on trying the various fire-places, I found that they all worked finely, which they still continue to do.

The other chimney is, with one exception, the tallest in the house. It comes out on a gable of one wing, and is higher than any part of the house near it. Its height above the ground is fully forty feet. It contains on the west side a flue for hot air, supplied from a furnace in the cellar, and opening into chambers by registers just above the floors of the second and third stories; at which latter point it stops. Next this, eastward, is a flue running almost perpendicularly from the cellar to the top of the chimney. It is about 8 ins. × 8 ins. except in the upper part above where the hot air flue reaches, where it is nearly 8 ins. × 12 ins. It is used for the smoke flue of the furnace and draws fairly. Into this flue, at a height of eight or nine feet above the floors respectively, the flues of the first and second story fire-places open. The third story fire-place has an independent flue running to the top of the chimney. There are dump flues running down from all the fire-places to the back and east side of the chimney stack, but in no way interfering with the other flues.

Neither the first nor the second story fire-place has ever drawn well. The chimney seems to have an aversion to smoke. The air lies dead. The smoke puffs out in clouds as soon as a fire is lighted, and is ready after the fire is fairly started to do so on the slightest provocation, such as the opening of a door or the sweep of a lady's dress before the fire. The fuel used is wood.

Sometimes when a fire is built on the first floor the smoke pours out through the fire-place on the second floor. This led me to believe that there was some stoppage of the main flue above the point where the second story flue enters it. I therefore had a hole cut in the chimney, and by letting down a candle I was able to examine every part of the inside of the flue. I found everything clear, the main flue uniform in size except for the enlargement before mentioned, the curves where the other flues came in well rounded, and, so far as I could see, everything in good order. There are rather large openings over the fire-places. I have narrowed the throats of these temporarily by putting in pieces of sheet-iron and brick.

I have put on a revolving turret. I have extended the chimney six feet or so by a piece of pipe. My mason cheerfully suggests that I brick up the fire-places and use stoves. As my chief object is ventilation, I decline this. My neighbor across the road suggests that I arrange ends with the chimney. There is merit in this, but I dislike the expense, and my wife objects to the dirt. What shall I do next? Can you help me? K.

[The freaks of chimneys are curious, and we should be bold to claim to be able to account for them all. But there is no doubt that our correspondent has required of his smoky chimney a great deal more than it ought to be expected to perform. He has carried the smoke from his furnace and two open fire-places into a single flue eight inches square. The expansion at the top does not help matters, for it is above the upper fire-place, so that all the smoke must first pass through the narrower part; it probably makes things worse by diminishing the velocity of the flow above. Most experienced architects and constructors will agree that either of the three duties imposed is enough for his flue. A furnace or an open fire-place ought to have one as large as this to itself, — the utmost that it is usually thought safe to add is a hole for a close stove in another story; and careful persons prefer to provide for every open fire-place a clear flue of eight by twelve inches. It is not surprising then that our correspondent's fire-places will not draw, but rather that even his furnace should be found to draw tolerably. The real puzzle is that the fire-places in the other chimney which he describes should succeed, if, as he seems to imply, they are all carried into one flue; although he does not say that the flue area is equally small, or that he has ever tried to burn all three fires at once. Things sometimes succeed that are done against all probability; we remember the saying of a clever physician that a baby might live if it were hung out of a window. As for a remedy, the only possible one, we should say, since our correspondent does not want stoves, is to build or to appropriate new flues for the smoking fire places. — Eds. Am. Architect.]

AN EXPLANATION IN REGARD TO THE COMPETITIONS IN INTERIOR DECORATIONS.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Sir, — As a disinterested, though not uninterested, spectator of the "Fourth Competition," I write for information. I cannot reconcile the "report" with the award of prizes.

The first prize (if I read aright) is given to a design of which the report speaks in no very flattering terms, to say the least; while the design placed first in the report — thus "roughly indicating its relative rank," and which is spoken of in the highest terms — gets the second prize. The design next mentioned, as equal (or nearly so) to the first in merit, gets no prize at all; while the design receiving "honorable mention" is not very honorably mentioned in the report.

Of course, there may be disqualifications, of which I am unaware, which have changed the order of merit from that (apparently) indicated in the report. If so, should they not be stated?

Respectfully, M.

[The discrepancy which our correspondent notices is due to the fact that the award and the discussion are independent of each other, the one being the work of the committee of architects invited to decide the competition, and the other of the regular contributor who analyzes the designs for our paper. That there should be occasional discrepancies under such circumstances is probably inevitable. It may be remembered, however, that different authorities may see the same merits and the same faults in designs, and yet assign them different rank according to the various degrees of importance which they attach to this or that special quality. The value of any criticism is less in the degree of its communication than in the qualities it can point out. — EDS. AM. ARCHITECT.]

THE SIZE OF AMERICAN BRICKS.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Sir, — I wish to call the attention of your readers to the present shape of our common hard burned brick. A brick should, with a reasonable joint of mortar, say ½ of one inch, more or less, in thickness, measure 8 in. × 4 in. × 2 in. With these dimensions the headers would, however, not serve to produce an eight-inch wall, but one 7⅞ in. thick. Let the actual brick be 8 in. long, then its width should be about 8⅛ in., leaving in an eight-inch wall a joint of ½ in. between stretchers. I have made many measurements of the best hard burned brick manufactured about New York, and find the average dimensions to be, length 7¾ in., width from 3¾ in. to 3⅞ in. These bricks, placed in a so-called eight-inch wall, leave a joint in extreme cases of an inch and a quarter between stretchers; in a foot wall we have header 7¾ in., stretcher, say, 3⅞ ins., joint nearly an inch; with three stretchers we have 3 times 3⅞ or 10 in., and two joints of an inch each. To this great mass of weak mortar I attribute the failure of many walls. Why should not the brick be ⅛ in. wider or ⅛ in. shorter?

N. L. D.

THE STORY OF AN OLD BRIDGE.

FRANKFORT-ON-THE-MAINE.

THE Old Bridge over the Maine at Frankfort is one of the most curiously interesting structures of its kind in Germany, and though not the oldest of its class, nor so rich in statues as the famous one over the Moldau at Prague, its known history, together with that of its predecessors on the same spot, takes us back to the days of Charlemagne. In general appearance it is not so antiquated as it really is, and many of its old and distinguishing characteristics have long since disappeared. Yet there is much left of ancient date to interest us. There are curious and rude sculptures over the doorways leading down to the mills; and on the opposite side, a crucifix surmounted by a gilded rooster, whose joint history leads us back some five hundred years, and about which legend delightfully clings. Then there is the red sandstone monument of Charlemagne, looking Rhinewards, holding in one hand the imperial apple, and in the other the imperial sword; a recent creation, indeed, erected in the year 1843, in commemoration of the thousand years' existence of the German empire. Goethe called this bridge the only ancient structure of importance in Frankfort.

The bridge has many legendary memories. The gilded rooster on the crucifix could tell us much of history if so it chose. Indeed, it is rather a mysterious bird. The boatmen think it was placed there to point out the deep current for their vessels; but the antiquary thinks it was perched there on purpose to defy him in his researches as to its why and wherefore. But legend has given the bird immortality, and a certain importance in the history of the bridge which we cannot overlook.

The story goes that the contractor found that he was unable to complete the structure within the specified time, and, fearing the consequences, he prayed to the devil for aid in his emergency; for in the good old times of which we speak, Satanus was a personage of authority, and much sought after in times of need. The devil, as we know, seldom leaves his friends in the lurch, and he promised to help the bridgemaker out of his difficulties on one condition. He would aid in finishing the bridge by the appointed time, and as his reward he simply claimed that the first living creature which should pass over the completed structure should belong to him. The devil drew up the contract, and the contractor signed it with his own blood, as was customary in such contracts. On the appointed day the bridge was completed, and the devil wanted his pay. But this time the "old familiar gentleman" found that the contractor had proved too many for him, for, instead of permitting any good Frankfort citizen to pass first over the bridge and lose his life and soul, he caused to be driven over before him a live rooster, and thus cheated the devil out of his pay. The devil was, of course, very angry at having made a contract so indistinctly worded, — so angry, indeed, that after tearing the innocent bird to shreds, he partly destroyed the completed work, shaking the central arch till it gave way; and it is just possible he would have destroyed the bridge entirely had not the clergy taken the precaution to institute a solemn procession and consecrate the structure on the following day.

The present bridge dates only so far back as the year 1342, although it had predecessors of stone and wood dating some centuries earlier. Baton says that Charlemagne built a wooden bridge here. In 1342 a violent flood tore down the tower on the Sachsenhausen side, and nearly destroyed the bridge. The present structure dates from this period, though it was not finished until the year 1419. In the middle there were two places left unarched, and simply covered up with boards that could be easily removed in case of hostile approach. The two places were walled over only in 1840. Thus the devil's wrath turns out to be after all simply human strategy.

The bridge was an interesting structure in those days. Besides the towers at either end, on which were on the one a crucifix and an insulting fresco directed against the Jews, and on the other an image of the Madonna and a box for the reception of donations towards keeping the bridge in repair, there were two mills, built about 1410, which may be seen to this day in newer shape. There were also a small chapel or sanctuary, and a little structure styled the Rat-house; and somewhere there were two secret chambers, the one for men, the other for women, — probably condemned criminals, who were here cast into the Maine; and, finally, there was, and is still, the crucifix with the gilded rooster. The Rat-house on the bridge was used for a very curious purpose. It was built in 1498, and in it, from this year to 1557, every afternoon a converted Jew stood and doled out a heller (farthing) for every dead rat brought to him by the city youth. After cutting off the tails, to keep as a voucher for the money entrusted to him, he cast the bodies into the river. In the year 1498 one thousand and eighty rats were thus disposed of. The money employed in this warfare against the rats was taken out of the fines paid by the Jews. In 1569 the Rat house was transformed into a place for the storing of powder.

We have just mentioned the presence of two secret chambers for the purpose of holding criminals. The crucifix and the rooster were erected on the bridge at a time when the most inhuman punishments were inflicted on criminals. False play, the wanton cutting of forest trees, the smallest offences, could be punished with death. Tortures of all kinds were in vogue, — piercing with red-hot iron, cutting off the ears, burning, drowning, and boiling in oil. Merian tells us that in the sixteenth century one hundred and thirty-one persons were hanged, fifty-three beheaded, forty-one drowned, sixteen torn on the wheel, seven burnt, and one buried alive, — all together, over two hundred persons in Frankfort alone, which city was a model of moderation. Dr. Kriegk is of the opinion that the crucifix and the rooster stand on the spot where the execution by drowning took place on the bridge; for under this arch the river was originally strongest and deepest. Here, too, the bodies of suicides were cast into the river.

But it is with the executions by drowning that we must explain the existence of the crucifix and the rooster. It was customary during the Middle Ages to erect a chapel or a crucifix near the place of execution, as was the case at Frankfort at places where executions of other kinds took place; and the crucifix and rooster were, doubtless, placed here, the former to call to mind the Redeemer, the latter to recall the denial and penitence of the Apostle Peter. To us now the rooster serves to attach those gloomy memories of old. The last execution by drowning in the Maine took place in the year 1618. These occasions were celebrated by the city guilds with great festivities. Possibly animals suffered at Frankfort as well as at other places. In an age when the authorities sent out criers to warn the May-chafers to get out of the land, and grasshoppers were threatened with ecclesiastical excommunication if they did not stay their ravages, it was not unusual to hear of animals being sentenced to death for their transgressions. To animals, birds, and insects were attributed a high degree of intelligence, which may account for the tradition that this rooster had formerly the faculty of distinguishing whenever a Jew passed over the bridge, when he was supposed to crow in mockery. People of the city have an old saying that every time this remarkable bird hears the clock of the cathedral church strike twelve, it crows three times. All we can say is that the rooster, besides reminding us of ancient barbarism, brings up in the legend connected with it relics of heathen worship. When the primitive faith was abolished, the devil had to fill out in his one person the places previously occupied by Odin, or Thor, or Loki, and to perform the labors which the giants had been accustomed to perform in the mythological era. The devil cast blocks of stone at the Christian churches like the giants did at cities. Like the giants, the devil appears as a master-builder. As the former are betrayed by gods and heroes in the building of Walhalla, so is the devil befooled by men in the building of the Frankfort Bridge. — *The Builder.*

NOTES AND CLIPPINGS.

The Safety of the New York Assay Office.—An anomaly in building is presented just now in the case of the Assay Office on Wall Street, New York, where may be seen an iron building owing its safety to wooden shores and girders. It is stated that General Steinmetz, formerly Superintendent of Repairs on Public Buildings, discovered when in office that the columns and girders of this building—one of the oldest iron buildings in the city—had become so affected by the vapors and fumes of the acids used in assaying as to be presumably untrustworthy. His reports made to the department on the insecurity of the building were accompanied by scales of iron two or more feet in length, which were easily detached from the iron columns. On the strength of these representations the floors of the building were strengthened by yellow pine girders and posts, which were put in about a year ago, which are thought to be able to support the floors should all the iron floor beams and columns give way. Mr. Mason, the assayer, does not believe that the vapors of any acids used are the cause of the trouble, but thinks that a leakage from the acid tanks in the upper story of the building has been the cause of the corrosion.

Fall of a Wall.—The sight of a laborer at work in a gravel-pit, undermining at its foot the bank which rises so threateningly above him, and which too often accomplishes its threat, is so common that few can wonder at the suicidal temerity with which laborers of the same class dig under the foundation of adjoining party-walls when excavating for a cellar. This every day folly brought about the death of a laborer at Elgin, Ill., on the 8th inst., who persisted in undermining the brick wall of an adjoining building, although the work had been considered dangerous for some days, and on the day in question his fellow laborers had refused to work.

Accident.—On Friday afternoon, August 9th, the fourth floor of a warehouse, 141 McElderry's Wharf, Baltimore, gave way and in its fall carried with it the two floors below. All the floors were stored with wheat, and the cause of the accident was simply overloading. Sufficient warning was given by the breaking of the upper floor to enable those in the building to escape unhurt, with one exception.

The Water-Jet in Excavation.—The serviceableness of the water-jet in engineering operations had a new illustration at Chicago not long ago, where it was necessary to lay five hundred feet of water-pipe out into Calumet Lake, for the purpose of obtaining water to supply the locomotives on the Michigan Central Railroad. The material through which the pipe was to be laid was a stiff blue clay, so hard that pickaxes made little impression upon it. As the pipe was to be laid some six feet below the level of the water, hand-labor was out of the question, and an attempt was made to excavate the trench by exploding one-pound cartridges of dynamite, but as the result of each explosion was to make a jagged hole only about six feet in diameter, this method was abandoned as being not only too expensive, but also too unsatisfactory. The next step was to try the effect of a water-jet. By means of a special suction-pipe, water was drawn from the lake to the pumping-station and then was forced through that portion of the pipe that was already laid, to the outer end of which was attached a hose with a one-inch nozzle. This was secured in position by heavy weights and anchors, so that it might not be thrown out of its position by the recoil caused by the resistance offered by the supernatant water. The pressure of water in the pipes was about sixty-five pounds, and before the jet the clay rapidly disappeared, being carried some distance away in a dissolved state before it had a chance to settle to the bottom. The trench cut in this way was unusually straight and perfect.

The Genius of Connecticut.—A letter has been received from Mr. Rogers in Rome, announcing that the crowning figure for the new capitol at Hartford, "The Genius of Connecticut," had been successfully cast in bronze, at Munich, and that it would be shipped in a few days.

Illuminated Clocks.—Herr Reiniger, of Stuttgart, has suggested that small towns may secure at small cost the advantages of an illuminated clock by making the same use of the powers of the magic lantern that modern advertisers have learned to appreciate so well. The image of a clock face and of the moving hands can be easily thrown upon a prepared surface, so as to be distinguishable at a considerable distance in spite of the grayness of the images of hands and figures. To produce such an illuminated dial it would probably be necessary to make use of one of those clocks called by the French *pendules mystérieuses*, which are to all seeming simply but a glass dial and a pair of hands, and the accuracy of whose movements there is much reason to doubt.

Conductivity of Heat.—Some recent investigations concerning the coefficient of conduction for heat of various building materials—excluding the influence of radiation, and making measurements by means of the thermo-electric multiplier—show that stones are much better conductors of heat when wet than when dry, and that various classes of them, such as marble, sandstone, granite, etc., have approximately the same coefficients of conduction, while bricks of all kinds are much worse conductors than the natural stones.

A Submarine Lamp.—In order to facilitate the work of divers by supplying them with a submarine lamp, Barnet and Foster compress oxygen to thirty atmospheres in a cylindrical iron reservoir, from which the combustion of an alcohol lamp is sustained. The escape of the gases generated is provided for.

Emigrating en Masse.—Possibly a new light may be thrown on the histories of the many deserted cities that are discovered in both hemispheres from time to time, by the statement that the walls of Marsala, Sicily, have been plastered with an announcement that its 35,000 inhabitants, in view of their inability any longer to bear the burden of taxation placed upon them, wish to sell their city. "They hope," the placard says, "to find buyers who can satisfy the cupidity of the vultures who lay waste the fair regions of Sicily, and that by emigrating en masse to Australia they may escape forever the talons of the harpies."

Japanese Earthquakes.—A very interesting historical paper upon Destructive Earthquakes in Japan was read before the Asiatic Society of Japan, March 23, 1878, by I. Z. Hattori, Esq. (Rutgers College), of the University of Tokio. It includes notices, drawn from native sources, of one hundred and forty-nine destructive earthquakes, distributed as follows: one in the fifth century; one in the sixth century; seven in the seventh century; seven in the eighth century; twenty-eight in the ninth century; eleven in the tenth century; ten in the eleventh century; one in the twelfth century; seven in the thirteenth century; eight in the fourteenth century; fifteen in the fifteenth century; eight in the sixteenth century; fifteen in the seventeenth century; thirteen in the eighteenth century; sixteen in the nineteenth century. Arranging the recorded shocks according to the seasons the author says: "If we take the 11th, 12th, and 1st months of the Japanese old calendar as cold months, 5th, 6th, and 7th as hot, and all the others as mild, then during the fifteen centuries, twenty-eight great earthquakes have occurred in the cold months, forty-seven in the hot, and seventy-two in the mild, or in other words, seventy-five in the extreme seasons, and seventy-two in the mild, the difference being only three." He also gives a curious description of an early Chinese seismograph, "invented by Choko in the first year of Yoka (132 A. D.)." It is quoted from the Life of Choko in Gokwanjo (History of Kwan), and is as follows: "The seismograph consisted of a copper vessel, whose diameter was eight *shakus* or feet, and whose convex cover was ornamented with characters, mountain turtles, birds, and beasts. In this vessel there was one main piston in the middle, with its eight branches, wires and springs. On the outside of this vessel were eight dragon heads, each of them having a copper ball in its full-opened mouth. Under each of the dragon heads there was a frog looking upwards with its mouth fully opened. The wire works and springs were very skilfully arranged in the vessel, but the cover was very closely fitted, and they could not be seen. Whenever the earth shook, one of the dragons dropped the ball, the frog underneath received it in its mouth, and produced a sound. By this means the direction of the shocks was ascertained. Once one of the dragons dropped its ball, but no person near it perceived any shock, and all the learned men of the capital doubted the trustworthiness of the machine; but after a few days a mail arrived from Kosai and reported the occurrence of an earthquake there."—*The American Journal of Science and Arts.*

The St. Gothard Tunnel.—The Swiss National Council has voted $1,368,000 as the contribution of Switzerland toward completing the St. Gothard Tunnel.

Archæological Researches in the Great American Bottom.—The alluvial plain known as the "Great American Bottom," lying on the east side of the Mississippi, in Illinois, between Alton on the north and Chester on the south, and having an average width of eight or nine miles, is a region of wonderful fertility now, and the remains of ancient occupation there abundantly found prove that the mound-builders were not blind to the agricultural value of this remarkable tract. It was indeed "one of their greatest seats of empire," in the language of Mr. H. R. Howland, who has published, in the *Bulletin of the Buffalo Society of Natural Sciences*, an account of certain notable archæological researches made in the "American Bottom." The mounds in this tract seem to have been divided into three principal groups; one lying within the limits of East St. Louis; another on the banks of Long Lake, twelve miles northward; and the third—one of the most extraordinary groups in this country—between Indian Lake and Cahokia Creek, some six miles from the Mississippi, and eight miles to the northeast of East St. Louis. In this last group is the great Cahokia Mound, by far the most important monument left by the mound-builders. The several groups are connected by lines of mounds at irregular intervals, and the total number is at least two hundred. Some two or three years ago Mr. Howland, having learned that one of the mounds in the second group was being removed to procure materials for road-making, repaired to the spot and found the work of destruction already well advanced. In the mean time some interesting discoveries had been made. At the height of four or five feet above the base of the mound the workmen came upon a considerable deposit of human bones, and on the same level were discovered a number of valuable relics, many of them wrapped in a sort of matting. This was made of a coarse, cane-like fibre, simply woven without twisting, the flat strands measuring about one eighth of an inch in width. Among the articles found were several tortoise-shells of beaten copper. One of these was about one sixty-fourth of an inch thick, two and one eighth inches long, and thirteen sixteenths of an inch in height: this was the largest one of three in the author's possession. Their shape is remarkably true, the workmanship evincing delicate skill. Each tortoise-shell appears to have been originally covered with several wrappings: first a woven cloth of vegetable fibre, then a softer, finer fabric of rabbit's hair apparently, next a membranaceous coating, finally a layer of non-striated muscular fibre—possibly intestines or bladder. Besides these singular objects are two specimens of the lower jaw of the deer, the part which contains the teeth being incased in a thin covering of copper, and the whole wrapped in the same manner as the tortoise-shells. Other relics found in the same mound—specimens of handicraft, sea-shells from the Gulf of Mexico, etc.—give evidence of the high grade of technical skill and the far-reaching intercourse of the prehistoric people who, in the long forgotten past, inhabited the "Great American Bottom."—*The Popular Science Monthly.*

The Dresden Theatre.—The new opera-house at Dresden is insured for $1,000,000, at an expense of $10,000 per annum.

A Curious Epitaph.—In one of the churches of London is said to be an epitaph quite as utilitarian as that famous one in a Paris cemetery which states that the widow of the late Monsieur X. "will carry on the business at the old stand." The Londoner is even more business-like in his grief, announcing to the world his loss in the following words: "Here lies Sarah Smithers, the loved wife of Thomas Smithers, marble cutter. This monument was erected by her husband as a tribute to her memory and a specimen of his art. Monuments of the same style £25 each."

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CONTENTS.

SUMMARY:—
The Death of Mr. Richard Upjohn.—The Patent Office Competition.—Newspaper Criticism on the Competition.—The St. Louis Custom House Building Frauds.—The Supervising Architect and his Subordinates.—The Results of Hydraulic Mining in California.—The Action of the Farmers.—The Fire Record of Boston 61

ARCHITECTS AND ENGINEERS. II. 62

THE ESCORIAL 64

THE ILLUSTRATIONS:—
Hudson River Hospital for the Insane at Poughkeepsie, N. Y.—Interior of a Dining-Room.—Grace Memorial Church, Darlington, Md. 65

CORRESPONDENCE:—
Letter from Paris.—Letter from Hartford 65

COMMUNICATIONS:—
The Present Condition of Cincinnati's three large New Buildings.—The State House at Albany.—The Indiana State House Bids. 65

AN IRISH MONUMENT 67

NOTES AND CLIPPINGS 67

WE regret to record the death, on the 17th inst., of Mr. Richard Upjohn, of New York, the first president of the American Institute of Architects, in his seventy-seventh year. Addressed as this journal mainly is to a class which has been accustomed affectionately to regard him as the father of American architecture, it is almost needless here to recall the circumstances of his career. His first essays in architecture in this country were made at a time when the art most needed examples of good style expressed with that soberness and reserve which are the natural results of thorough training and sound, manly common sense. These qualities, which have eminently distinguished his abundant work, were the good seed sown in the midst of the wild and exuberant growth of fancy in which the young art of the nation first endeavored to express itself. We are indebted to Mr. Upjohn for Trinity Church and St. Thomas's of New York, Grace Church and Christ Church of Brooklyn, Grace Church of Providence, St. Paul's of Buffalo, St. Peter's of Albany, the Cathedral at Bangor, St. Paul's of Baltimore, and numerous other churches, besides secular buildings of every kind in all parts of the country. These were to the American public of the second quarter of the century the first monuments of pure style known to their experience; and notwithstanding our notable advance in historical knowledge and aesthetics, and in the experience of art during the third quarter of the century, many of these structures have not lost their power to teach, and none of them have lost that expression of dignity and propriety which belongs to all true and honest work in art. His personal memory will itself "stand like a tower" to those of us who in youth have had occasion to apply to him for counsel or encouragement, or who have associated with him in professional relations. Wise and slow in speech, sound in judgment, kindly and generous in sympathy, of ripe experience and fine instincts, he did more in his day than any other one man to awaken a fraternal feeling in the profession, and to break through the isolation of conventional jealousy and unreasoning distrust in which, twenty years ago, every architect found himself involved. In the earlier days of the Institute, his interest in the cause of professional fraternity was constant and active, and although, towards the date of his resignation from the office of president in 1876, the burden of years so pressed upon him that his official functions became at last little more than nominal, his honorable name alone, with its long train of professional associations, was a standard and a defence. It is not well that a life so full, an experience so complete and symmetrical, should be suffered to pass away without a testimony of respect and affection. The Board of Trustees of the American Institute of Architecture will take immediate action on his death.

IN our next number we propose to present the report of the expert committee of architects, Messrs. J. K. Wilson of Cincinnati, R. M. Upjohn of New York, and H. W. Hartwell of Boston, regarding the competitive drawings submitted for the restoration and enlargement of the Patent Office Building at Washington, together with a reproduction of the successful design. The Secretary of the Interior has recognized the services of the committee in a letter of thanks, and by the adoption of their award, through which Mr. J. A. Vrydagh, of Terre Haute, has been appointed architect of the new works. This transaction appears to be a very gratifying indication of the satisfactory results which may be obtained from the honest and intelligent use of architectural competition in public works. There are points open to criticism, of course, in this trial case, but under the circumstances we do not see how a fairer and more auspicious beginning of a better state of things could be made. If the final result justifies the means, the other branches of Government, and Congress itself, may learn from this example how the professional resources of the country may be made available in all such national undertakings, thus relieving the Supervising Architect from a kind of labor which it is impossible for him to perform in a manner satisfactory to himself or to the country, and enabling him to prosecute his natural and proper functions as a general supervisor and auditor of building accounts without the distractions and anxieties incident to such an accumulation of purely professional and artistic work as hitherto has embarrassed the operations of this office.

SOME newspapers in opposition to the Government have not failed to take exception to this new departure in the national architectural work, and to criticise it as unnecessary, wasteful, and absurd, quoting the opinion of "several leading architects" of Washington that, while the idea of the design is very good, the design itself is "execrable," and that the proper person to furnish the design and do the work is Mr. Edward Clarke, the Capitol Architect, who is a regularly salaried officer appointed by the Secretary of the Interior, and subject to his orders. The professional character of the board of experts is sufficient to justify us in the belief that, of the designs submitted, the one chosen is on the whole the one best suited to meet the requirements of the programme. Of its intrinsic (not relative) qualities our readers shall presently be able to judge for themselves; for that reason we publish it. The national architecture is a proper subject for free and intelligent criticism. Nothing can be more indicative of a high state of civilization, nothing can more directly serve to raise and maintain a higher standard of excellence, than a tendency to discuss works of art. "The Athenians," we are told by very high authority, "spent their time in nothing else but either to tell or to hear some new thing;" and we may well believe that the architecture about Mars' Hill owed no small part of its perfection to the atmosphere of criticism in which it had developed. As the act of the Secretary of the Interior is, as he says, an experiment to ascertain whether the highest professional ability of the country may not in some way be made available for the national architecture, the charge that, for the sake of a mere sentiment, he has taken a step adverse to the public interests by thus neglecting to make use of the official architect, who may be supposed, of course, to be familiar with this especial building, virtually falls to the ground. If he shall succeed in illustrating by example that there is a better method than the old one, the true interests of the public and of civilization will have been distinctly advanced. The profession cannot remain uninterested spectators of this process of transition.

THE dark cloud of fraud and malfeasance which has lowered around the construction of the St. Louis Custom House is a phenomenon which is not in any degree cleared away by further developments. We had occasion in our issues for December 15, 1877, and January 12, 1878, to draw attention to certain investigations as to the quality of the work supplied under the superintendence of Thomas Walsh, the result of which was that three indictments were found against him and his assistant, Patrick, for conspiracy to defraud the Government, and against Lydden and Runyan, contractors, for perjury in testifying that certain piers built by them and paid for as solid were in reality hollow shams filled with rubbish and grouting. For technical reasons, or for want of what was deemed sufficient evidence, those indictments failed, and at the request of the U. S. District Attorney the cases were transferred to another judge, to be tried in January. This new trial has not taken place, but meanwhile the evidences of fraud against Walsh and his subordinate contractors have so accumulated and have become such a public scandal that, not-

withstanding the alleged unwillingness of the Supervising Architect, who, it is stated, has steadily sustained his subordinate officer while "under fire," the President, under information furnished by the District Attorney, has removed the offending superintendent, and appointed Henry G. Isaacs in his place. The building, we are informed, is only three fifths completed, yet the original estimate of total cost, four millions and a quarter, made at a time when the values of labor and materials were much higher than have since prevailed, has already been largely exceeded. Meanwhile Walsh has been getting rich on his modest stipend of $10 per day, and of course is not inconvenienced by his enforced retirement. The courts have for some reason refused to allow the appointment of another grand jury to further investigate the case, and it seems probable at present that the ring will go unpunished. Unfortunately, moreover, the original books in which the quantities of material were recorded as received at the building, and the daily records of laborers and mechanics, as kept by the time keepers, have disappeared, and the prosecution, if any occurs, must rest largely upon Walsh's own papers, which doubtless have been duly prepared for any emergency.

This journal has repeatedly called attention to the difficulty of maintaining a sufficient and honest system of supervision over work which is carried on at great distances from the office of the Supervising Architect. The multiplication of contracts in every department of labor and supply, the complication of accounts, the temptation to fraud, the ease with which conspiracies against the treasury may be contrived and maintained, in the execution of great public works of construction, notwithstanding the most accurate system of checks and balances,— all these things show that the duties devolving upon the central office cannot be properly discharged without the most suspicious, exacting, and industrious scrutiny; and even with this, the Supervising Architect must be liable to error and charges of collusion with distant rings. Doubtless the official reports and accounts regularly presented to him are prepared according to form, and arranged to meet and satisfy a usual and methodical system of auditing; he must be in receipt of constant complaints and charges against his subordinate superintendents from dissatisfied contractors, but he has probably learned from experience that these must needs come in the ordinary course of events, and must be duly allowed for. He is bound, as every administrator must be, to sustain his representatives until these charges are proved and these complaints justified. It is not our business to apologize for the Supervising Architect, or to extenuate, palliate, or deny the charges constantly brought against the office by our contemporaries of the press, as in this case of the St. Louis Custom House. We only desire to demand for an underpaid official with large and complicated responsibilities a suspension of judgment in such cases, until incapacity or collusion is made far clearer than is possible with the ordinary facilities of irresponsible observers.

The condition of some of the California valleys would furnish the moralist with a very pretty image of the sterilizing effect upon the heart of man of the headlong pursuit of lucre. Our first generation of colonists, going there for gold, naturally disregarded all the other advantages of the country, and fell to work to get out the gold in the easiest way, without concern for what the secondary results of their procedure might be. The mining interest, being the first in the community, was allowed its own way, and for a long time nobody thought of providing any defence for other interests which it might hurt. The natural means of separating the gold from the sand was washing, and the easiest way was to carry the auriferous soil to the mountain streams, and let these wash the sand away. This system, developed by machinery, is the hydraulic method of mining practised in California to this day. The first miners, washing away in their diggings among the hills, paid no heed to what went on below them. But now that California is become a rich agricultural State, it is found that her river bottoms, the most fertile part of her lands, are being ruined by the miners. The *débris* from the mines chokes the rivers, raises their beds, diverts their currents, and is spread by the freshets over the alluvial valleys in layers of mud and sand that destroy tillage and cover the fruitful land with barrenness. Says the Sacramento *Record Union*: —

> The most fertile area of the northern region is menaced with destruction. It will, if no preventive measures are adopted, be gradually buried under several feet of a barren sand, incapable of cultivation. Navigation of the Sacramento will be stopped, and the river will be transformed into a mere ditch.

The trouble has reached such a point that the farmers are beginning to unite for self-protection. The land-owners on Bear River, a small tributary of the Sacramento, have formed the Bear River Farmers' Protective Society, and have brought a suit against the company whose mines the river washes, in behalf of one of their number whose lands have suffered. The miners are naturally unwilling to give up a long exercised privilege, even though it is destructive to their neighbors' property, and the suit has roused great interest as the first battle in a struggle of moment. If we may trust the evidence given at the trial, the issue is by no means too soon opened. It was testified that in 1857 Bear River was a clear stream, running through an alluvial bottom between banks ten or twelve feet high; that since then its bed had risen from ten to fourteen feet, so that it had overflowed its banks, in one place leaving its old channel and forming a new one, in others straggling all over the bottom; that the water had become so muddy as to be useless for drinking, for cattle, or even for irrigation; that the land of the plaintiff, Keyes, had been submerged with "slickens" (soft mud) and sand, so that hardly any crops could be raised on it, reducing its value from fifty dollars an acre to ten or fifteen; that his house had been surrounded by a sea of mud, and his orchard of five or six hundred trees destroyed; and that the agricultural population of the valley had been reduced one half. All this injury is ascribed to the influence of the mining; directly, in filling the river with sediment and *débris*, and indirectly in laying bare the rock of the hills, by which the suddenness and violence of the floods after heavy rains is much increased.

We have received the Fifth Annual Report of the Board of Fire Commissioners of the City of Boston, which, among other things, illustrates in a most masterly way how it is possible to waste public money in printing more than double the amount of information strictly necessary. From it we learn that during the year of which the report takes cognizance there were 514 alarms which called out the fire department; 185 of those were what are known as "still" alarms, and only 278 were fires for which a public alarm was rung. The total loss on buildings and their contents was $135,780, which is nearly fifty thousand dollars less than in any one of the preceding five years. The report shows that the Fire Department is equipped with thirty-two steam engines, eight chemical engines, one hand engine, sixteen independent hose carriages, and fourteen hook and ladder carriages of various kinds. These are managed by 264 permanent men, who can, on occasion, be reinforced by 349 reserve or "call" men. From the statistics of the fires actually occurring, which are given with much particularity, we learn that the police gave more than half of the public alarms, the members of the department gave about half of the others, while the remainder were given by citizens. One alarm, unfortunately a false one, was given by an automatic alarm, thus showing that, although these apparatus are of extreme delicacy and will be eventually of the greatest use, they require much niceness of adjustment to render them reliable. The damage to goods and buildings which is due to flooding of the building with streams of water, especially since the introduction of the steam fire-engine, has been in fifty-two cases entirely avoided. In these instances the fire-extinguisher and the chemical engine proved able to put out the fire. During the year the department, besides assisting at fires in five neighboring towns, has sent detachments to Marblehead, Mass., Providence, R. I., and Putnam, Conn.

ARCHITECTS AND ENGINEERS. II.

We took occasion, last week, to deprecate the dissociation which there has been of late years between architects and engineers, and to point out some of the ways in which greater concert between them would be of advantage to each profession in itself. When we consider not merely how the specific work of each has its points of contact with that of the other, but how many matters of general interest are, or should be, the common care and study of the two professions, we see the same reason for concert of action between them that there is for community among the members of each. The same interchange of ideas and the same stimulus of common interest that make valuable the associations of architects or engineers among themselves ought to be as efficient between the two.

Their common subjects of study are very many; some of

them very important, and at this moment very prominent. We may instance the employment of new materials and methods of construction, and the testing of all sorts of appliances for building and of innumerable substances whose uses and properties are as yet undetermined. The problem of the use of metals, especially of iron, the pressing constructive problem of our day, is their joint problem. The fact that the use of iron depends directly on its economy of space and cost makes its design depend more imperatively on its properties than in the case of any other material. It is therefore especially necessary that constructors and designers shall study its employment together. Engineers have inquired cunningly into some of its properties; but there are others yet to be determined. Architects have groped about for suitable forms for its use, without having yet invented any which are satisfactorily characteristic. Questions of heating and ventilation, moreover, even of planning and distribution, as well as of construction in building, require the study of both. The whole of what for want of a better name people have called "sanitation" is common ground. Architects cannot, engineers should not and do not, let it alone. Ventilation and heating, the arrangement of house plumbing and drains, town drainage and sewerage, foundations and grading, are intimately connected among themselves, and constantly bring the engineer and the architect — or at least their works — into contact. The general planning or the physical improvement of towns, a most important and neglected subject, cries out for attention from both of them in consultation. It would be disheartening to say, if it were possible, how many towns have been laid out with mere machine-like formality, or built piecemeal and patched into hopeless confusion of plan, how many natural advantages have been thrown away on them, all for want of some capable authority to look out at once for their convenience, health, and comeliness.

To a certain extent experience and endeavor in all these things are made common by the ordinary means of communication, — by technical periodicals and books, by common observation of each other's work, and by the unnoted transmission which makes ideas common property. But, obviously, nothing is so efficient as personal intercourse between men who are engaged in the same pursuits. Since there is so much to be done in common, it is worth the while of engineers and architects to consider seriously how they can help each other, and increase their usefulness to the public, by joining their forces.

A good deal might be accomplished in this respect, if we would bend the twigs in the direction in which we would have the trees incline, by beginning in the schools, and educating engineers and architects more in common. It may be objected that this would be likely to confuse the bounds of the professions, but we doubt if that would be its tendency. Something of the other's skill is necessary, in fact, to qualify each for his ordinary work, in which it is not, and ought not to be, worth while to call in the assistance of the other. Not only do the two provinces overlap enough to make it desirable, but some study of the other's special work ought also to make each at once more sure of his own footing, quicker to see when he has gone far enough in the direction of the other, and more respectful of the other's power to go farther. We have more than once spoken urgently in behalf of training architects in the theory of construction; a closer fellowship between the professions should emphasize this need rather than supersede it. The architect who is well taught in construction will build more skilfully, and will see more clearly when it is well to call on the engineer, than his less trained fellow.

In like manner it would be well if engineers were given some training in design, for a certain amount of designing they will, in the nature of things, do. The mechanical draughtsmanship that they are actually taught amounts to nothing more than a training of hand. It would do the young engineer no harm to be taught early that beauty of form is a real good, quite apart from ornament, which he may abjure if he will; that the interval between beauty and deformity, measured in inches, may be much smaller than is commonly suspected; that there is usually a considerable "margin" within which, consistently with the most severe and logical construction, proportions and adjustments may be varied to the side of beauty or ugliness, and a wider one within which variation is possible in the interest of beauty without a sacrifice of essentials or of cost worth noting. To this end it is desirable that he should be taught enough of free-hand drawing to clear his perception of form. Then he could be given elementary problems in design, and instructed to some degree, not in knowledge of styles and of ornament, nor in the historical and eclectic knowledge which architects must acquire, but in the use of outline, proportion, and distribution, the essentials of all design.

It would be well, we think, if architectural and engineering pupils were even required, in the schools, to associate in certain parts of each other's studies, and made to work in common. The architectural student who habitually saw the engineer calculating his strains and dimensions with precision might have the less patience with the careless ways in which many of his fellows use their material. The engineer who had been in the habit of watching the careful study of an architect's work might learn to distrust his own attempts at serious designing. It would even be an advantage if complex problems, involving work of both kinds, could be made a part of their course, and given out to them in common, an architectural and an engineering student working together, each contributing his special skill to the joint solution. Such exercises would teach both early in their career to respect each other's province, and would prepare them for efficient coöperation in actual work, showing them how their ideas might, without injury, be accommodated to each other's requirements, — a thing which it is not so easy to learn after one's habits have hardened in practice.

The actual professional work of architects and engineers gives many occasions, not so freely used as they might be, for personal consultation and coöperation. Now and then there are buildings which are important enough and difficult enough to lead to the employment of both an architect and an engineer. There are many problems in which it would be well if the architect would take an engineer into consultation, or the engineer an architect. There is, to be sure, a pride, natural enough but easily overstrained, in being entirely sufficient for one's own work, which may incline each to look upon resort to the other as a confession of weakness, — a feeling, perhaps, that to do so is to forfeit something of his claim to the plenary confidence which each expects from his client. In this respect the architect will have to make greater concession than his neighbor, for the capable architect must have and is expected to have constructive skill, while the engineer need lay no claim to power of design. But often the architect may reasonably spare himself the sole responsibility of a difficult construction, or may guard against error in his judgment or his computations, by consulting a specialist in construction; and as often the engineer might save his work from needless deformity by taking a lesson from his brother professional. In the way of general repute, each profession would gain more, we are convinced, by the other's tribute than it would give up, while the public would get better work from both.

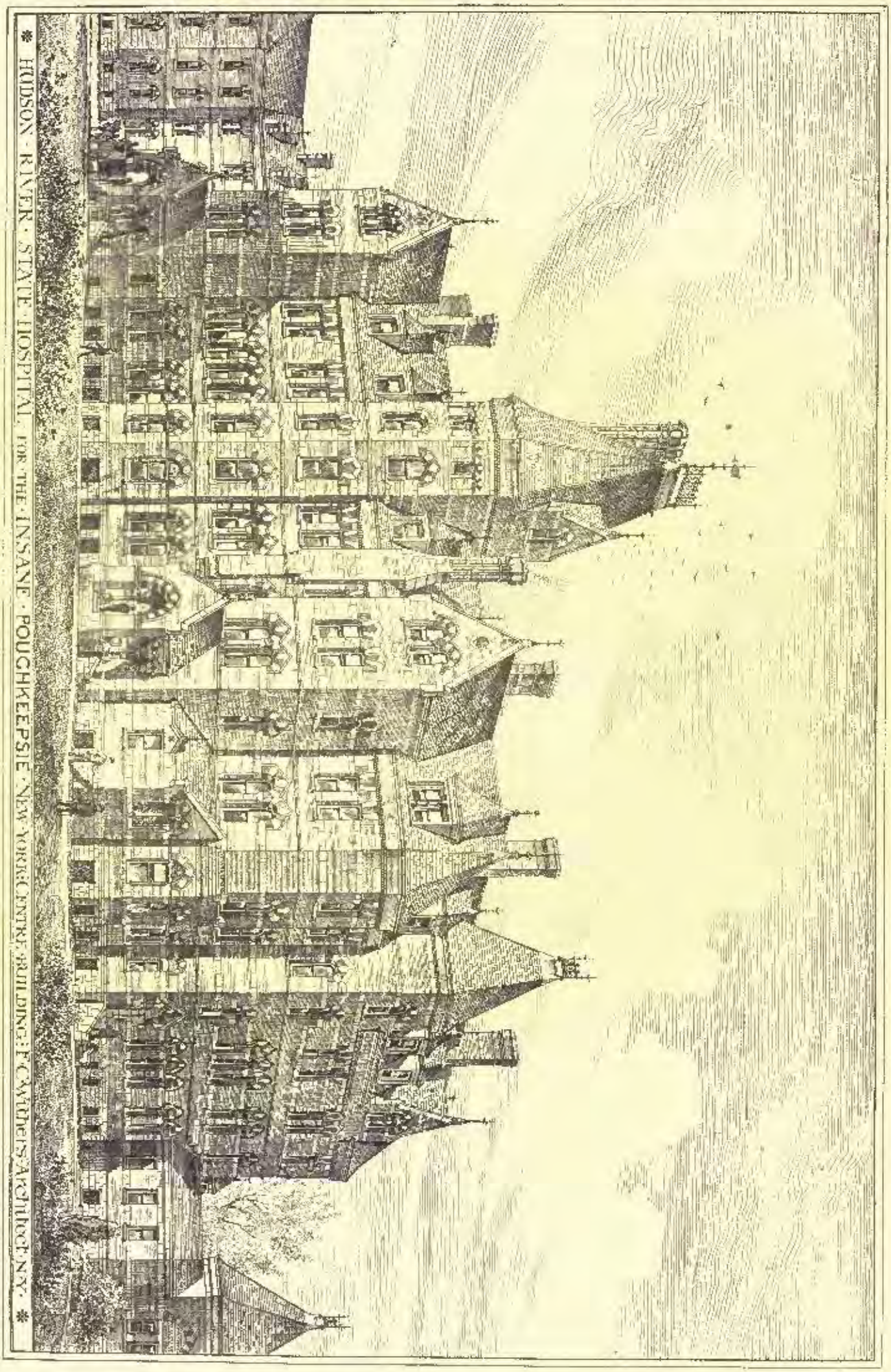
In most of the German cities, architects and engineers are united in the same professional societies, and all their chief professional journals cover both specialties. In England and France there is less fellowship, but there have been and are journals devoted alike to both together. Indeed, several French engineers have written valuable architectural treatises. The "Traité d'Architecture" of M. Léonce Reynaud and M. F. de Dartein's "Étude sur l'Architecture lombarde" are known to many of our readers. There is in the United States at least one city, Baltimore, where the local professional society unites both engineers and architects; much to the advantage of both, its members maintain. There are nevertheless many subjects for common consultation peculiar to each profession, over which it would be a waste of time for the other to linger. It is probable, therefore, that in the long run it will be found better that their technical associations shall be separately organized; but we have no doubt that some sort of affiliation, which should lead to their meeting occasionally to consider together the subjects that interest both, would always be found helpful to both. Social societies might wisely arrange for occasional joint meetings, and the annual conventions in which architects and engineers come together from all parts of the country might find it for their advantage occasionally to meet in one for the discussion of topics of common concern.

There are probably few countries in which there is more to be gained by union between these two professions than in ours. There is none, perhaps, in which both are growing so fast in acquirement as well as in organization, and none in which people at large need so much to be taught the value of their special training. Mutual support may be made to advance both their acquirements — therefore their usefulness — and the confidence of the public in them.

THE ESCORIAL.

Dismay unexampled has been created throughout Spain by the official announcement that this unique palace and temple of Spanish pride is to be, in a manner, dismantled, and converted into a gallery of art rather than a tomb. A technical objection to the burial of the young Queen Mercedes may have influenced the royal decision, but it is none the less peremptory on that account; and, in fact, the Escorial is a structure of whose traditions, as they stand, any Spanish sovereign might well wish to be rid, more especially one to whose dead wife it refused a grave. It may, possibly, be in consequence of this that a royal decree has gone forth, transforming the gloomy edifice into a centre of holiday resort and home of pictures and sculpture, from a solitude, of art indeed, yet one which was little more than a melancholy reminiscence for Spain. The guide-books, — even the best of them, — give but an insufficient idea of that lonely, magnificent, long-walled, and high-roofed edifice, which seems like a part of the mountains amid which it stands. The Spanish architects, with all their love of tradition, can scarcely keep it intact: rain drops through the Saracen roof, and wet disfigures the Arabian floors. Yet this was the eighth wonder of the world. Thirty-eight years ago the entire edifice was in danger of perishing entirely out of sight, when a public subscription saved it; but, even since then, revolutions have stripped it of many treasures, and now, except for the intervention of the government at Madrid, with a reasonable purpose, it would be condemned to final ruin. As to the traditions, they are, like most traditions, faulty in the extreme. The structure is not a palace, or convent, or a tomb, but all three combined, and its name may as well be derived from a group of rocks, a cluster of scrub oaks, or a weed, as from the traditional gridiron of the ultra-Catholic saint. Moreover, the history is altogether uncertain which ascribes the building of the edifice to the second Philip, after the victory of St. Quentin. Modern investigations have demonstrated monastic relics of a far earlier date. The broiling work had been done, if legends may be believed, long before the architectural gridiron was constructed. But, as its history is coming now into question, and may rise into importance before long, as substituting a grand picture-gallery of Spain for a sepulchre, some little notice may be worth bestowing upon the great shrine of the dead, built over the site of a Pagan temple. Its first stone was laid, it is said, April 23, A. D. 1563, by Juan Baptista de Toledo, "whose great pupil," says the controversial authority, "Juan de Herrera, finished the pile September 13, 1584," though for neither of these statements have we any absolute warrant whatever. It is not even certain that the Escorial was either designed or erected by Spanish architects — or, still less, by French architects, — at all, while the Moorish genius was still in the enjoyment of its full glory throughout Southern Europe. The Escorial, it is true, has not the Saracenic character; it is not a multitude of green-painted copper-vaulted domes; but it is a tomb, though it was intended to be a palace. Nobody knows who created it. The King of Spain himself could not tell. A French bodman, Louis Foix, once claimed the credit as his own. Colmenar, Morері, and Voltaire, all asserted the design as having originated with France. To whom, however, the design is due, it was not a happy one; and the man, half king, half monk, who inhabited the mighty convent during fourteen years, could have felt little more glorious beneath its roof than if he had been an Indian fakir. Still, the Escorial, associated as it has been, through nearly the last three hundred years, with the arts of Spain, is, under all circumstances, a centre of European interest, though not, like the Alhambra, celebrated on account of its architectural and artistic wonders. Those who see it from the neighboring hills are, at a first glance, undoubtedly disappointed. They have come, probably, from the ruins of the Acropolis, or the relics even of Dax, in Southern France, and they find little in the huge Spanish structure which satisfies any antiquarian or artistic sentiment. The building is a vast uprearing of cool, gray granite; its roof is blue-slated, with leaden pipes and gutters; it might be a manufactory, a prison, or an asylum for lunatics, for all that the outward appearances show. But the whole configuration of the place is a denial of its vulgar traditions. There are no eleven thousand windows, any more than there are eleven thousand chambers at the Vatican, or were Virgins at Cologne; what critics exist in the heavy walls "resemble a ship's port-holes, and might be real embrasures for cannon," — unplanned for the gigantic structure they were intended to illuminate, — "bits of bigotry," as the writer of the Imperial Philip declared, and altogether degrading to an architect.

There is no such other building in the world, and we doubt whether it can ever, even as a picture-gallery, be made humanly enjoyable. Viewed from a distance, it looks, as it has been described, like a palace of death. The interior is even more gloomy. Seven hundred and forty-four feet from south to north; five hundred and eighty from east to west, partially Doric in style; gridiron, with a little addition of fancy, in shape; towered at the four corners, platformed in front, and terraced, with fishponds on the upper and under slopes; three thousand square feet in area, and, as the guides are never tired of reiterating, within the centre, the chapel surmounted by a dome; sixty-three fountains, twelve cloisters, eighty staircases, sixteen court-yards, and three thousand feet of painted fresco, "exceedingly magnifical of fame and glory through all countries." So far, the guides. We are left to better instructors when the grand interior is reached. There is nothing to view, except corruption and hideousness, in the Hall of Dead Kings, and little better in the Vestibule of Sovereigns, with its statues of the Kings of Judah, each seventeen feet high, all cut up, the keepers of the triple structure say, from a single granite block, with hands and heads of marble, crowns of gilded bronze, and figures resembling, in all except their leanness, those of the Caryatides. In the great court the stranger is confronted, and, it may be said, confounded, by a vastness and magnificence nowhere else to be exemplified in the world, not even in the palace regions of Agra, Benares, and Delhi. For, a parallelogram opens upon him three hundred and twenty feet long, by one hundred and twenty feet less wide, marbled, colonnaded, cloistered, partly white, partly colored, some of it cloistered, some of it mosaicized, all intensified in the highest sense and meaning of architectural beauty. There are, in this open space, no fewer than two hundred and seventy-five windows, a barbaric waste of adornment, not giving a proportionate degree of light, because the whole design of the edifice is one of shadow. Nevertheless, something like a splendor is thrown upon the entire group of palaces, or temples, or monasteries, or whatever they may have been intended to represent, by the grand Arabic flat roof, the half-hidden choir, the cavern-like arches, and the perfect distinction of the mighty edifice from all other monuments approaching it in glory between the West and the East, the North and the South, of Europe. The eye is first attracted, not by ornament, but by the absence of it, — no gold and purple virgins, no blue and gilded infants, — all simple and solemn; but so far away from the present life of Spain that little wonder is left when its reigning king determines that the Escorial shall be, not tomb, or convent, or oratorio, but a bright and monumental gallery of art. Already it is so, in a particular and special sense. The chapel, in itself, is of more than Roman magnitude, three hundred and twenty feet long, two hundred and fifty feet wide, and three hundred and twenty feet up to the top of the cupola, the warning and the stigma over-crowning all, that "God alone is great!" Unlike the Alhambra, the Escorial was never devoted to other than a Christian purpose. For in it there was no "last of the Abencerrages;" it has been, from its foundation, a Christian palace, temple, and sepulchre, and is now to be the Vatican of Spain. Yet, long ago, and since its existence, it has inclosed a world of art, with the red-veined steps of its high altar, its jasper columns, gold and bronzed based; its Cangiaqui frescoes, and its senseless San Lorenzo on the gridiron. Never was so lofty a Christian shrine thus wantonly degraded, with its gigantic saints and its martyrs; its brass medallions and pasteboard rood; its wooden tabernacle and its gilded effigies of kings. The reigning monarch of Spain, according to the decree, intends, however, to respect the ancient art conserved in the chambers and corridors of the Escorial, while dedicating them to a more exact and distinctive purpose in connection with the arts for which the Spanish genius has so long and so superbly been celebrated. The bronze-gilt figures in the oratories will not be removed, or in any way disturbed; the painted effigies will still kneel at their grotesque altars, and the profane epitaphs of former Spanish monarchs are to remain unashamed of the dust by which they are rebuked; while, again, "the statues which are portraits," will not be displaced; but there is abundance of room for the royal pleasure, even though the works of Giacomo Trezzo, Lucca Giordano, and the Pelegrino Tibaldi are superseded with those, the bronze medallions, the holy rood, and the fifteen gilt statues of Pompeio Leone, not to mention the Saviour on the column, and bearing the Cross, and the Ascension of the Virgin, by Z. Zuccaro. We have here the nucleus of a magnificent Spanish National Gallery, glowing with Spanish art from the days when Spanish art was in its zenith, at its climax, and, indeed, in its perfection. Already, as we have said, those who have visited the Escorial must have recognized on its walls the masterpieces of historical portrait-painting. Assuredly, we have never admired, in the much-boasted Bavarian galleries, portraits equal to those of Philip II., the mother of Philip III., and Don Carlos, comparatively modern though they are. There are fifty inferior altars in the Escorial, each surmounted by a picture, which is not invariably a portrait, and archæologically interesting as illustrations of armor and costume. Besides these, we have reckoned over the canopies of Navarette the Dumb, who "spoke with his pencil," the Spanish Rubens, the Zuccaro, the Sanchez, and the Tibaldi. It is to be marvelled at, however, how the young King of Spain can imagine himself as possessing a power to contradict all the traditions of his ancestors by transfiguring, as it were, this triple shrine into a sort of commonplace picture and sculpture gallery, when its principal traditions are so kingly, historical, or sacred. The Relicario itself must be removed before the building can be secularized; eleven whole bodies, three hundred heads, "Hunter," says Murray, "never founded a finer anatomical museum." A thousand other points might be polished in this light, but they are scarcely worth keeping in sight. The interest, for the living generation, consists in the future destination of the Escorial, as decreed, in his bereavement, by the young King of Spain. We have to remember that the Spanish monarchs possess absolute authority in these matters. Philip II. "kept these precious relics in five hundred and fifteen shrines of Cellini-like plate, some wrought by Juan D'Arfé, but La Houssaye took all the bullion, and left the relics on the floor. These, when he departed, the monks collected in baskets, but, in the confusion, many of the labels got undocketed, so that," etc. But, in all this splendid pillage, there were sacred images and vessels of silver and of gold, with other wonderful works in the precious metals; yet with these the world of to-day has little



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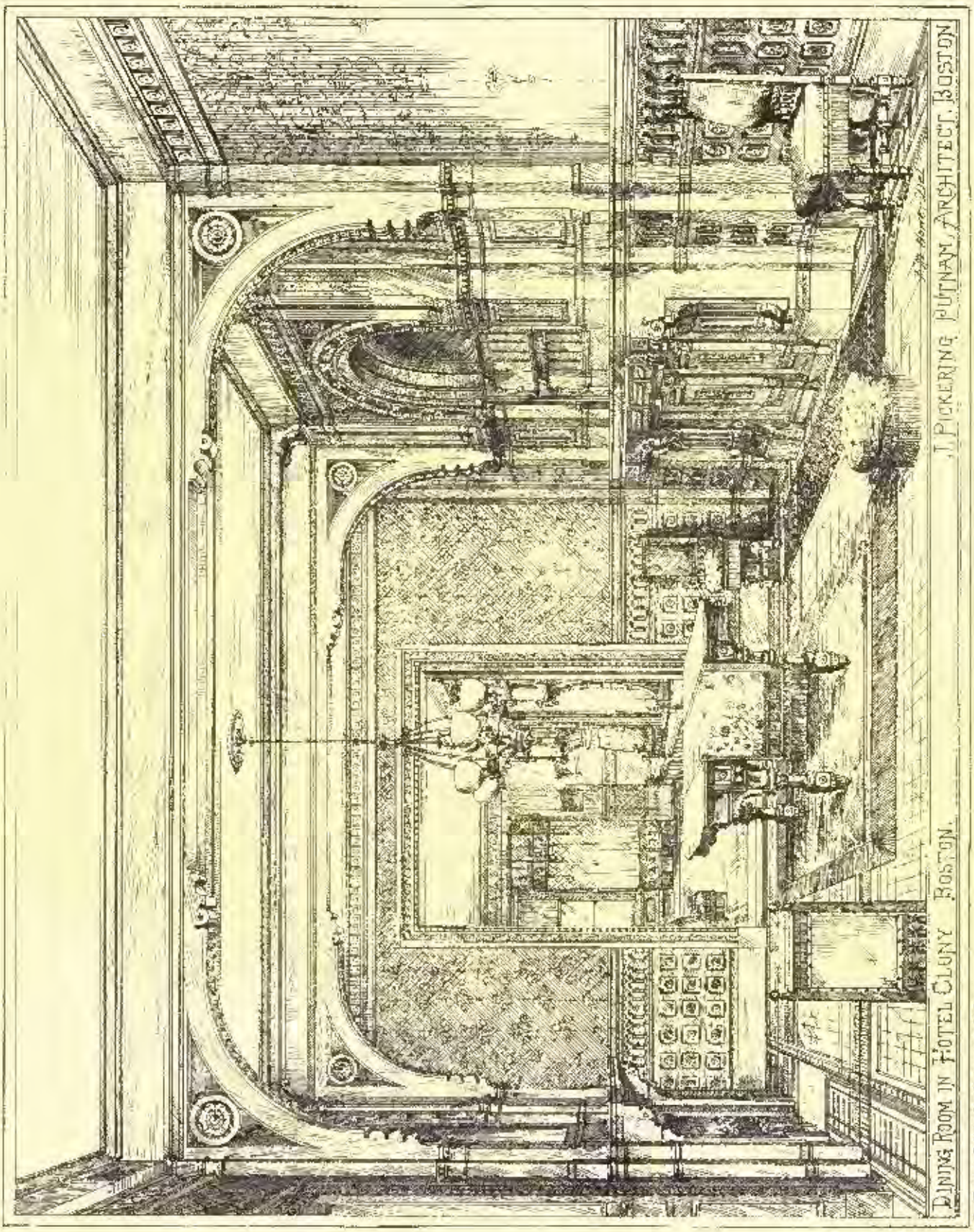
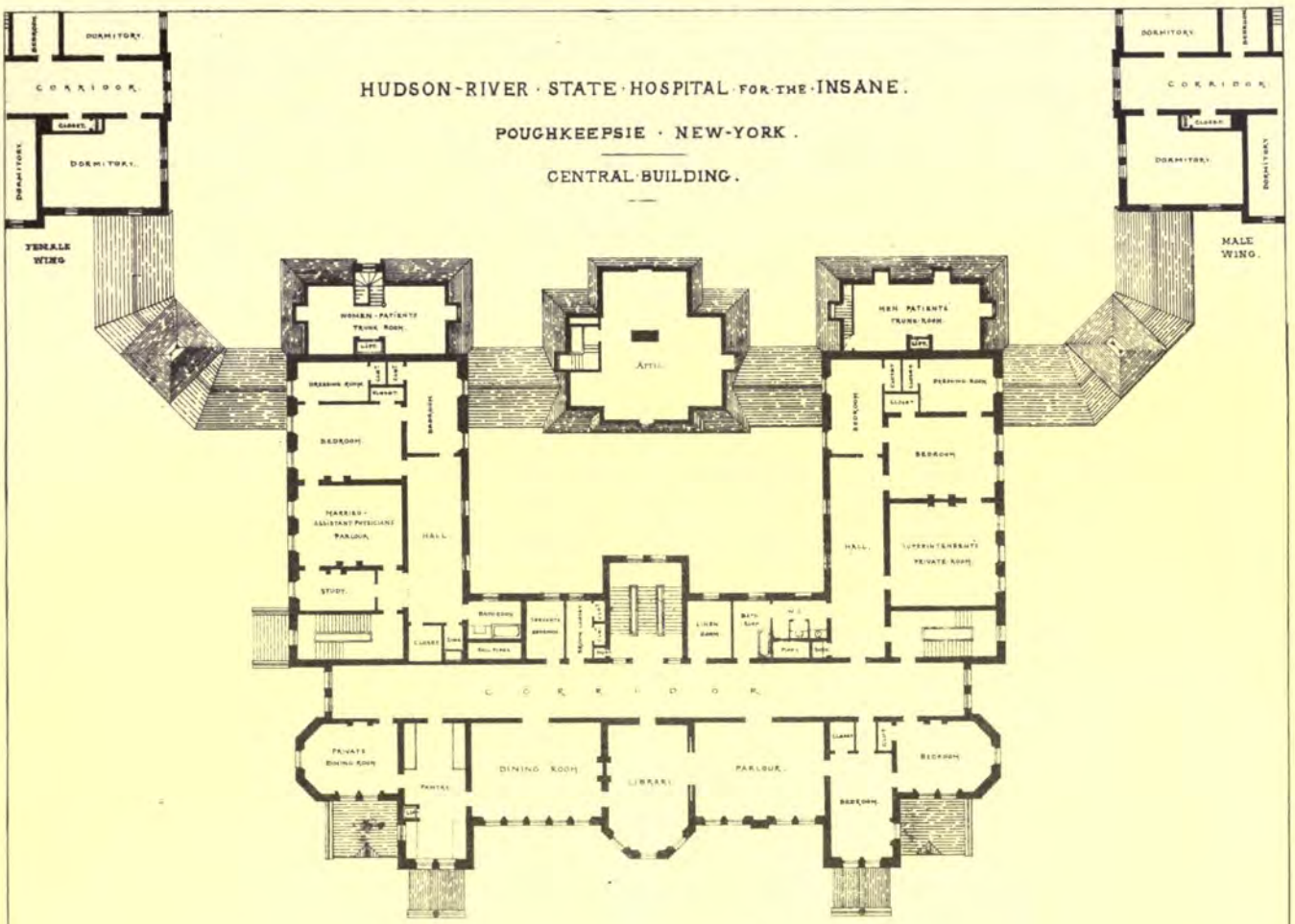


DINING ROOM IN HOTEL CLUNY BOSTON. J. PICKERING PUTNAM, ARCHITECT, BOSTON



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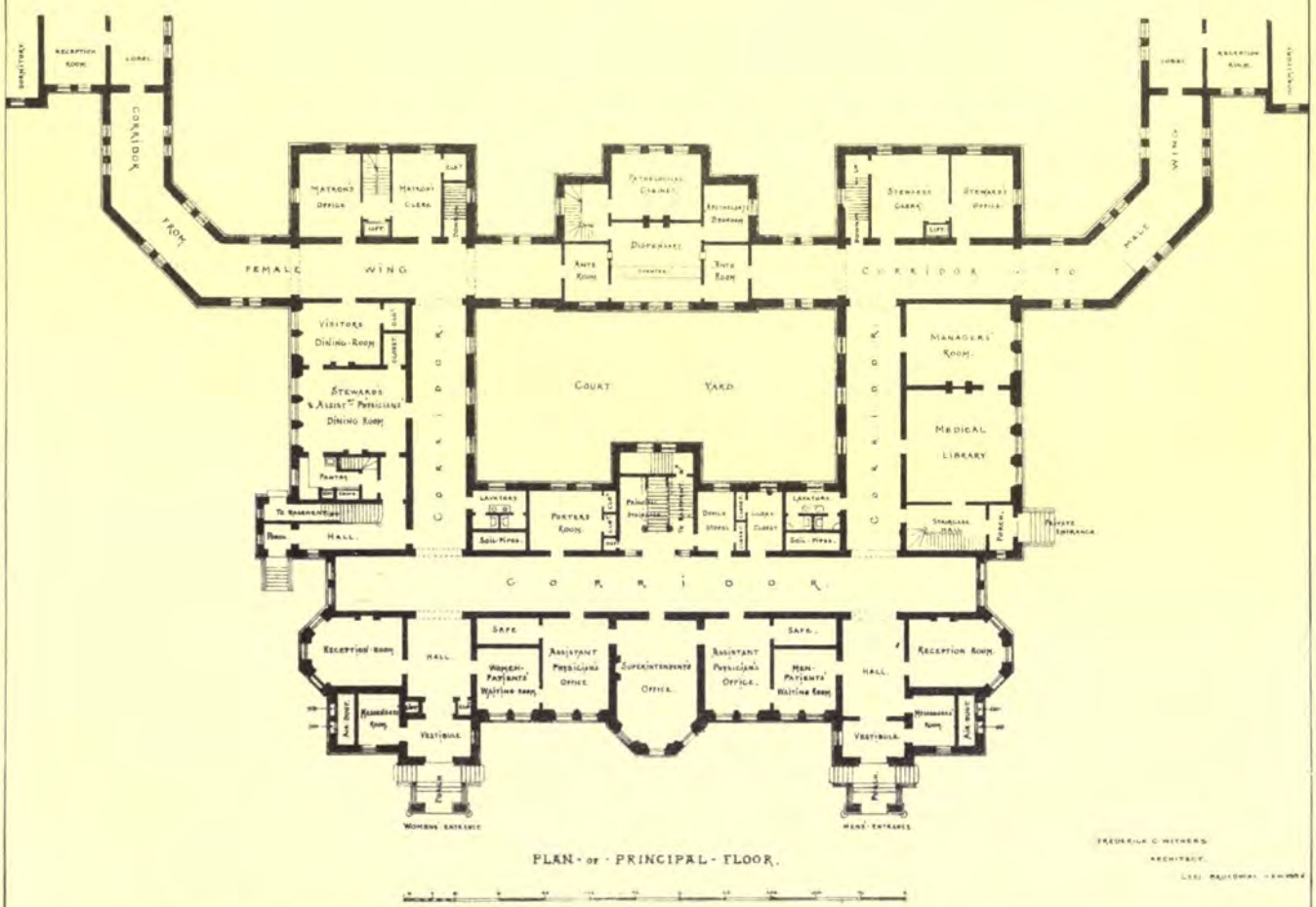

PLAN · OF · PRINCIPAL · FLOOR.

FREDERICK C. WITHERS
ARCHITECT

THE HELIOTYPE PRINTING CO. 230 DEVONSHIRE ST BOSTON

enough to do; it descends, indeed, into the royal tomb, and finds nothing there beyond royal tombs, chamber-houses of death, gorgeous and ghastly with Spanish marble, gilt, and the customary Golgotha decorations. Then, a deep vault, with a land-spring, irrepressible, heard trickling behind its masonry. Afterwards, as an Italian author, copied by an English gazetteer, writes, "descending again by a green and yellow-colored jasper-lined staircase, at the bottom of the Pantheon," there is an octagon, so many feet high and wide, with crucifixes, niches, and figures, sculptured by all manner of Italian artists, though not claimed as belonging to any especial type of modern, mediæval, or ancient art. The resolution of the young king, however, is rather an unsatisfactory one at the best. The Escorial is one enormous grave. It is a place of royal tombs, although, notwithstanding the terrible legends related concerning old kings and queens of Castile, the Pantheon, the Sacristá, the Cameria, the palaces, and the many churches, are full of Christian history and inspirations, with the rich, dark stalls of the chapels, the low and the high stall, the Titian cloisters, and the Corinthian illustration, wrought in several varieties of wood, of the victory of San Lepanto, with its overshading blues and yellows, colossal books, and Syriac emblems of silence. The Escorial is, to some extent, an *epitome mundi*, a history of the modern world, on a small scale, with all its chronicles of guilt and misery; but we have nothing to do with that, — only, indeed, with the guide-maker's information, — "Walk through the royal suite of rooms, which are not very royally furnished. First visit Don Carlos's, with some pictures, a stray piece by Ribera, but a fly and a poodle are most pointed out. There is some good Madrid tapestry of hunting subjects; some china, some fine marqueterie panelling and steel hinges inlaid with gold." Amid all this wealth of art, we find the Escorial so singularly rich as to become a wonder that its treasures were never appreciated before. It was the Christian Alhambra. — *The Building News.*

THE ILLUSTRATIONS.

HUDSON RIVER STATE HOSPITAL, POUGHKEEPSIE, N. Y. MR. FREDERICK C. WITHERS, ARCHITECT, NEW YORK.

IN our issue for March 30, of this year, we gave an illustration of a portion of one of the wings of this asylum which had lately been completed. We now give a view with plans of the Central or Administrative Building, which is nearly finished, and will be ready for occupancy some time this year. The plan provides for distinct entrances for the different sexes, with waiting and reception rooms for the patients and their friends, all of which will be under the immediate control of the superintendent, whose offices will be in the centre of the building. The Dispensary Building, one story in height, is placed in the rear, so as to be accessible from either of the wings. In the second floor will be accommodations for the managers, the superintendent, and the married assistant physician; and in the floor above for the other officers of the establishment, with rooms for the servants in the attics. The walls are of brick with finish of Bigelow blue stone and Ohio stone.

DINING-ROOM IN THE HOTEL CLUNY, BOSTON, MASS. MR. J. PICKERING PUTNAM, ARCHITECT, BOSTON.

This room is one of a suite of apartments occupied by Mr. W. H. H. Newman, the owner of the hotel. It is finished in oak with a parquetry floor of maple and cherry. The walls are treated with a paper of Pompeian red with a rich gold figure, and the ceiling in buff with a few lines of color. The general tone of the wall surface, notwithstanding its color, is quiet, and the rich carvings of the woodwork are well relieved against it. Adjoining this room, as shown, is the parlor, finished in cherry very richly carved, ebonized, and gilded. All the carvings of these rooms and of the suite were done by the contractors for the building, Messrs. Morton and Chesley, of Boston. The plans and façade of this building were reproduced in our issue for August 3.

GRACE MEMORIAL CHURCH, DARLINGTON, MD. MR. T. P. CHANDLER, JR., ARCHITECT, PHILADELPHIA.

CORRESPONDENCE.

THE FAÇADES IN "THE STREET OF THE NATIONS."

PARIS.

A SOJOURN in Paris is often said to be worth a journey round the world, since members of so many nationalities frequent it; especially is it so now, when at the Exhibition one may see a knot of Norwegian students in white caps and evening dress clothes elbowing aside a band of Algerians or Persians in white flowing robes, or a group of Brittany peasants, unconscious of their costumes of three hundred years ago, laughing at the pig-tail of a Chinaman. Above all are these costumes interesting as one strolls down "The Street of the Nations." This is the right-hand of the two avenues which divide the semi-detached Pavilions of the Fine Arts from the other Exhibition galleries. It was a happy idea of M. Berger, director of the foreign sections, that the different countries should decorate the fronts of their sections upon this avenue each with its national style of architecture. The idea has in general been well carried out, and adds a decided interest to the Champ de Mars.

First comes England, with a far larger area than any other country, France of course excepted. She has divided her frontage into five detached façades. The first a small city house, of brick I was about to say, but which is in fact built of a patented invention which imitates brickwork, by screwing on to a wooden frame sheets half an inch thick of some painted plaster preparation. What lofty national aspirations are thus symbolized by sham brickwork, I cannot imagine, but as it was erected before Lord Beaconsfield resuscitated English prestige, possibly now that nation may find it unworthy of her new dignity. The second building, especially set apart and furnished for the Prince and Princess of Wales, is no less unworthy of their national architecture, for it is almost a burlesque in brick and stone of an Elizabethan façade, so poorly does it represent that fine old style. After this comes a front in terra-cotta, a florid advertisement of the Lambeth pottery works. Then follow two neat and pretty cottages, showing unpainted timber framing in the old English style.

The next building is that of the United States. I am tempted to pass it by unnoticed, as I have tried to do for very shame, when walking by with foreigners; but one must be more frank with one's countrymen, who at least know of what we are capable. Frankly then, our façade is a disgrace to our country and to our art. Disgraceful to the former because it is cheap and paltry, and to the latter for its tawdry vulgarity. The French critics have said little about it, as coming from a land from which they expect only machinery and raw products. In the best guide to the Exhibition there is, however, an ingenious explanation, perfectly sincere, prompted evidently by kind feelings towards us and by reminiscences of the play of "Uncle Sam." It says that the United States with characteristic originality wished probably to show, as a type of national architecture, with what rapidity a temporary bar-room (*guinguette*) is put up in one of those wonderful cities of the far West! National pride can blind us to much, but all the gaudy shields of the various States which bedeck it cannot hide the fact that this is a perfect description of what we put forward as our contribution in the way of architecture.

From this point the façades improve. Sweden and Norway appear hand in hand, with two well-designed chalets of unpainted wood, the two joined by a gallery. The Italians have a loggia of five bays, the central one raised into the chief feature. Italy's best art industries are expressed in the building. Columns of a composition called *marmorides* wonderfully imitate real marble. Delicately moulded terra-cotta pilasters, as well as mosaics and *sgraffiti*, — arabesques in monochrome, — are representative features of their work. The Japanese, with their wonted sober appreciation of artistic contrasts, have chosen that only a massive wooden door should give access to their world of delicate devices. Next, a gray stucco wall, stamped with fine white squares and pierced by a characteristic portal, announces the fantasie and ingenious Chinaman. Spain clothes herself gayly in the style of the Alhambra, with many colors and stalactites. Austria, not caring perhaps to offend its many jealous nationalities by a preference, has taken refuge in a most non-committal portico of coupled columns and round arches, the whole decorated with black arabesques on a light ground. Even at some distance from it the visitor is aware of something unusual before him; but it is not until he stands in front of Russia's façade that he realizes what a gallant effort she has made, in spite of the ruinous war upon her hands. She certainly has the second best of all the façades. It is of wood, and consists of a central building with steep roof connected by galleries with a large and a small pavilion, the latter reached from without by an open stairway such as is common in the churches in Moscow. It produces a curious effect to see high, steep roofs combined with dormers and turrets capped by Oriental bulbous shapes, while a heavy basement of logs contrasts with the fantastic Eastern designs in the carved window caps. But this mingling is characteristic of the "Colossus of the North," whose feet are planted on the Asiatic sands. The ornamented parts alone are painted, and in simple primary colors. The designs were sent from St. Petersburg and are said to have been suggested by the palace of Kolomna, near Moscow, where Peter the Great was born. Switzerland is tired of her chalet and appears in a more original garb. One enters under a huge portal surmounted by a gable over an open arched balcony. We are now before the finest of the fronts. Not only did little Belgium give six hundred thousand francs for this building, but her clever architect, Janlet, has produced a real work of art in combining a historic Flemish with a modern style. A fine central pavilion, with fantastic sixteenth century Renaissance gables and dormers, is joined by modern galleries on one side with a quaint bell-tower, and on the other with a dwelling and school-house. The whole, of brick and stone, is most intelligently designed. Without ostentation many marbles and "exhibits" are introduced and quietly labelled, making it as useful as might be. It was, I believe, erected first in Belgium and then taken down to be rebuilt here, and will return to take a permanent place somewhere as a national monument. It has, in conjunction with the very fine exhibition of Belgium, added greatly to the prestige of that busy little state.

After these dark northern stones and bricks a blaze of light heralds something southern, and introduces us to Greece, represented by a house of the time of Pericles. Two stories with a slightly projecting loggia from the second suggest Greece more in the details than in the general aspect, which seems just to miss the real Hellenic character. The effect of dazzling white relieved with judicious polychromy in delicate lines, not in the brutal masses of some enthusiasts,

is at least one of studied refinement. Denmark's front would, but for the interposition of the Grecian one, have been mistaken for a continuation of the Belgian, as it is also Flemish Renaissance; but imagine one's surprise when the same style appears markedly, though with other influences, in the façade of Central and South America! A southern climate has transformed the steep, high roofs into terraces with balustrades; but here are the same little elongated pyramids rising from all the angles, the same quirks and quirls in broken pediments. A moment's reflection explains this resemblance. Central America draws its traditions from Spain, who in her turn has been in times past much under Flemish influence. This influence, however, almost disappears in the second part of the building, which consists of three open arches supporting a second story, from which projects a light covered balcony closed in with glass. The whole is completed by a rather ugly square tower. Partnerships continue the fashion here, for next come Persia, Siam, Tunis, and Morocco. Each has a narrow slice of the front, and all are thoroughly Oriental. The most curious is the bit over which the White Elephant of Siam floats. It is of dark brown wood ornamented at the angles by what looks at first like forged iron work, but turns out to be the wood polished and rubbed with something which gives it a metallic lustre; add to this a Chinese-looking roof with turned-up angles, and the effect is most original. With the Grand Duchy of Luxemburg and the Principality of Monaco are associated two tiny republics of which the world seldom hears: the first, San Marino, in the northeastern part of Italy, is one of the smallest and oldest states of Europe, with an area of twenty-one square miles and an army of eighty men; the second, Andorra, on the south side of the Pyrenees, received its independence for aiding Charlemagne to defeat the Moors in 700. With its area of one hundred and ninety-one square miles it may lord it over its microscopic associate republic; but I fear neither are usually cited on the "Glorious Fourth," as hoary ancestors of our own republic. Its administration is directed by twenty-four consuls, elected from the population, I believe.

After this geographical excursion, — did I not say a visit here was like travelling round the world? — we stop before the imposing front of Portugal. The superb old monastery at Belem near Lisbon has furnished a magnificent recessed portal, filled with elaborate and fantastic carving, reproduced in plaster from the designs of M. Pascal, taken on the spot. Window tracery from the same building, of most curious southern Gothic design, divides the sections in the interior. As if to make up for their small frontage, most of these last countries have continued their style in the interior, while the first ones have left the interiors entirely to the exhibitors themselves. The Low Countries have a fine monumental structure in brick and stone, with lofty tower; and this brings us back to France and the rear vestibule, whose vast proportions make the avenue and its ordinary-sized houses seem like baby-houses as one looks back. R.

THE CONNECTICUT THEOLOGICAL INSTITUTE. — STATUES FOR THE STATE HOUSE. — EPISCOPAL CHURCH AT NEW BEDFORD.

HARTFORD, CONN.

The most recent architectural work of marked importance in Hartford is the Connecticut Theological Institute, soon to be built from designs by Mr. F. H. Kimball of this city. The site upon Broad Street is an exceptionally good one, the lot having a frontage of two hundred and twenty-five feet and a depth of nearly three hundred. From the partially perfected plans, it is learned that the Broad Street façade will measure about one hundred and ninety-five feet, inclusive of the library which is connected with the main building by a covered way fourteen feet long. The main building is flanked by this library and by the chapel, running from which, and at right angles, is a long wing, terminating at its further extremity by a dining hall, beyond which again, in a partially detached building, are the kitchen, kitchen offices, etc., with servants' quarters above. A wing parallel with that connecting the chapel and dining hall, will be built on the opposite (or south) side of the lot, thus forming three sides of a quadrangle, the fourth side will in time be completed by a block joining the dining hall, and provision for future dormitory accommodations is made by the extension of the south line of buildings. The materials used in construction will be brick and light-colored stone. It is designed to make the library fire-proof. The chapel, located at the junction of the two principal lines of buildings, will form a prominent feature of the general design, and will have bold projections which serve to break up the lines of the adjoining blocks. The principal approach to the Institute will be from Broad Street, while the chapel has an entrance on the north side. The main building will be three stories in height, and besides a reception room, president's room, etc., will contain lecture-rooms, which with a corridor on the rear side occupy the width of the block. The north and south wings contain, upon this floor, respectively, lecture-rooms (with janitor's quarters near the dining hall) and a professor's study, reading-room, etc. The capacity of the chapel can be increased by the use of the adjoining lecture-rooms both in the main building and the north wing, these rooms having large folding doors upon the chapel side. A covered way extends along the south side of the north wing, from the main building to the dining hall, which interiorly will measure about twenty-eight by sixty feet. Communicating with the wide corridor in the main building, at either end, are the principal staircases built in the square towers at the intersection of the main building and the wings.

Above the lecture rooms, etc., the first floor, on either side of a central corridor, will be occupied by the students, whose quarters consist of a study and a separate bedroom, both well lighted and ventilated, Each study being also furnished with a fire-place. A few rooms are arranged for two men, but the majority offer single accommodation. In the wings the corridor is on the north side, thus giving to the apartments the proper southern exposure. The south wing contains an intermediate floor occupied by students' rooms, and the upper portion of the dining hall building will also furnish additional quarters. The second floor throughout will be occupied by students' rooms. A gymnasium will be built in connection with the Institute. Excavations are now being made, and the foundations will be put in at an early date. When completed the buildings will have cost in the neighborhood of seventy-five or eighty thousand dollars.

The State of Connecticut may regard with pride the embellishment of her Capitol with statuary. As mentioned in a former letter, two of the many canopied corbels, provided in the architect's design for the reception of statues, have already been occupied by the figures of Connecticut worthies, and recently large blocks of Carrara marble have been received at the works of the contractor for the building, J. G. Batterson, from which statues to crown the pedestals about the capitol dome are to be cut. The statues, twelve in number, will be at the base of the cone, and standing out in bold relief will produce an unquestionably fine architectural effect. They will be cut from models which have been made by Mr. J. Q. A. Ward of New York, and by May 1, 1879, they will be set in place according to the terms of the contract. The price of the statues will be $1,200 apiece. The commissioners have also ordered one of the medallions upon the eastern façade of the building over the entrance, to be cut. This medallion, one of many on the front, will be enriched by a sculptured head of Dr. Horace Bushnell, a prominent theologian and a man to whom Hartford is in a great degree indebted for the ample park close by which the capitol has been built. The head of Noah Webster will form the subject of the second medallion. The crowning figure of the dome will be of bronze. It is a lofty statue symbolizing the "Genius of Connecticut," and is by Rogers, the American sculptor at Rome. The figure, which was cast in Munich, weighs six thousand pounds, and is now on its way to this country.

Mr. F. L. Olmsted of New York has furnished surveys and plans for laying out the grounds about the building, and already work has begun. The two remaining buildings formerly occupied by Trinity College will be removed this season, and under skilful treatment a handsome park will be laid out. A prominent feature of this plan is the preservation, as far as practicable, of the fine old trees which adorned the college campus.

Mr. W. C. Brocklesby of this city has in hand an Episcopal church now building at New Bedford, Mass. The church will be built of brick laid in red mortar, and will have finish of Longmeadow stone, the walls up to the water table being laid in courses of local stone. It is to be thirty-eight feet wide by about seventy long, exclusive of the chancel, which is recessed to a depth of sixteen feet; the chancel is flanked by the vestry room and the organ chamber, the former being carried out beyond the face line of the church and treated with a gable.

The length of the church is divided into five bays, buttressed to the height of the main walls. Upon the side nearest to the street a tower occupies the width of the last bay, and is carried up to a height of forty-five feet. At the ground floor level the tower serves as a vestibule, the entrance being through a pointed archway whose jambs are laid up in beaked brick. The walls above are pierced by large windows with louver openings, and above is a gable. The walls are carried out on corbels to receive the kneelers of the coping, a richly carved finial in stone surmounting the gable, and the angle face of the gable will be enriched by diaper work in brick. The main walls in the side bays of the church are pierced by a segmental-arched opening having triple windows with trefoil heads, the arches being turned with beaked brick, and the label-mould formed of bevelled brick projecting from the face of the wall. The front of the church is characterized by a gable pierced by a rose-window. A large segmental arch inclosing a series of mullion windows is a prominent feature of this façade. The central windows beneath the arch have transom-lights, the corresponding spaces of the side windows being filled with brick laid in patterns. A wrought iron cross surmounts the gable.

Internally the church will be finished in unpainted pine. The roof will be marked by the lines of the trusses which correspond with the exterior buttresses. Above the tie-beam a semicircle is formed, the sheathing following this outline and that of the curved braces below. Oak posts beneath each truss, and at a short distance from the wall, support an upright stud mortised into the truss, and a horizontal plate extends from post to post, the posts being tied to the wall by a projecting timber carried over the plate, and furnishing support for the foot of the curved brace.

A pointed arch with projecting brick-work supported on stone corbels, divides the chancel from the church. The chancel is apsidal in form. Light will be admitted at the roof. The windows of the church will be of rich cathedral glass, the large one in the front to be put in as a memorial and illustrative of Biblical subjects. Provision has been made in the plan for more ample Sunday-school accommodations in the future.

The erection of a portion of the large steam chimney which flanks the gateway at the new Trinity College buildings is now under con-

tract, and will soon be completed. This chimney is an important feature of the design for the gateway, and is treated with most excellent effect. It is circular in form, being some twelve feet in diameter at the base and tapering as it ascends. It is constructed exteriorly of rock-face ashlar and light stone, in conformity with the adjoining blocks. Within this shell the requisite flues are laid up with brick. An ornate cap of light stone is to crown the chimneys.

Cheltwood.

THE PRESENT CONDITION OF CINCINNATI'S THREE LARGE NEW BUILDINGS.

Cincinnati, O.

We see by a late number of the *American Architect* that all the "public (United States) buildings are under full progress." This is certainly news to the citizens of Cincinnati, who have listened for months past for some sound of hammer or trowel from behind the high board fence surrounding the Custom-House, as indicative that this work is under full progress. To be sure, the first story, with its forest of girdled columns, is completed, and the second story seems ready and anxious to receive the weight it must inevitably bear. The seven immense derricks, high up in the air, throw out their large arms, ready to grapple with any stone coming within reach; but that is all. A few brick masons are all that are employed; and in order that these masons may do their work properly it takes an equal number of bosses and superintendents to look after them, whose high pay runs on all the same, work or no work.

The Shillito Building has been under roof for some time; the plastering is finished, and carpenters are now busy completing the immense interior. The exterior of this building, with its five hundred and sixty-seven feet of street front, and its twenty-three bays, is very monotonous. Each bay is just like its next neighbor, and the whole may be likened to a street parade of well-drilled soldiers, so uniform, straight, and severe are the windows and piers. The whole army, so to speak, is capped at a height of one hundred and thirteen feet above the pavement by an insufficient galvanized-iron cornice. The settlement of this building, which was noticed in a former number of this journal, seems to have stopped, the spalled bricks have been taken out and replaced by new and good ones, and the cracked stone has been duly patched up. What would we do without putty in some shape or other?

The Music Hall is finished, accepted, dedicated, and is now in use. At a cost of about $300,000, Cincinnati has one of the largest halls and the largest organ in the country. Architects are familiar with the exterior of this building, as a perspective view was published in No. 122 of the *American Architect*. We feel called upon to state however, in this connection and in the cause of truth and honesty, for which we labor, that that perspective was somewhat overdrawn. There are no such reveals around the large central window as that drawing would have us believe; on the contrary, the central gable, with its large series of windows combined as one, has a rather flat appearance, and the two towers flanking it have from their lowness a tendency to make the whole building squat; and from any good point from which the building may be viewed they hide more than half the main gable.

The inside of the main hall is finished entirely in poplar, or as they term it out here "tulip wood," varnished, and it has a very barren and unfinished appearance, a great deal of inch thick stuff being used to help out the unlucrerful effect. The railing is somewhat too heavy, and the graining might have been better. The acoustic properties of the hall, however, are good.

As for the exposition buildings, they are not built and probably never will be, so it is hard to tell how they would look.

C.

THE STATE HOUSE AT ALBANY.

Albany, N. Y.

The new capitol, while promising much beauty of interior, is forever marked architecturally on its exterior with non-affiliation with original design. Highly decorated but disproportioned dormers impose their heavy stone flanks on massive bow girders, despoiling the symmetry of attic rooms, and the acroterial finials and tympanums are composed of sculptured "blazes," of funereal significance; and coats of arms and crests of some of the commissioners, with such mottoes as "JOVI-PRŒSTAT-FIDELE-QUAM-HOMINI," and "SI-JE-RUIS." Certainly strangely odd, and of questionable taste in free America, and on a public building.

D.

THE INDIANA STATE HOUSE BIDS.

Indianapolis, Ind.

The proposals for the work of building the new State House were opened on the 15th inst., according to advertisement. The lowest and highest proposals for the whole work were $1,611,675.65, and $2,114,714.13, respectively, and about as great a difference appears in the sub-bids, which goes to show that some one has made a mistake in taking out his bill of quantities, as their judgments as to the value of the work are so much at variance. The commission has taken the proposals under advisement; no contract has been awarded except that for the steam-heating, to Walworth & Co., of Boston, for $45,803.35. It is thought the work will be awarded in detail. The commission and architect seem much elated over the result, as the bids are much below their estimate. As far as business ability is concerned, the commission is to be commended, but it is trammelling the architect by dictation, which is unwise and unpleasant for him. It has even gone so far as to dictate what should be the style of decoration and the different design of the work. It began by fixing the per cent of his commission and, it seems, has carried its aspirations to controlling the design, so the commissioners are the architects in chief, with Mr. May as chief draughtsman. It is hoped he will assert his right and authority, and let them know who should control.

S.

AN IRISH MONUMENT.

One of the most interesting of the ancient monuments of Ireland, the Grianan of Aileach, in the county Donegal, which stands on the top of a hill eight hundred feet high, on the property of Lord Templetown, has just been rescued from destruction by the efforts of Dr. W. Bernard, of Derry. It is a circular fort, which was originally built in pagan times, and formed part, at a later period, of a regal residence rivalling the famous palace of "Tara of the Kings." It commands an extensive prospect, extending on one side over Lough Foyle and over Lough Swilley on the other. In the year 1101 Murtough O'Brien demolished it and ordered his men to take away one stone of the building in every empty sack which they had, and with them to head a parapet built at the top of his palace, which occupied the site of the present Cathedral of Limerick. Some other stones were taken away in recent times to build the parapet of a bridge in the vicinity of the ruin; but Dr. Bernard believes that no other stones were taken for building purposes. In the reconstruction of the fort only the fallen stones were used, except seven or eight hundred which were picked up about the hill, and a coping of masonry. It is perfectly circular and stands about twenty feet high, of conical shape, with massive walls built without mortar by wedging the larger stones together with small ones. Inside it is about seventy feet wide, having three platforms rising above each other, approached by steps, and is crowned by a parapet. There is but one entrance, which looks eastward, and there are doorways inside, which seem to lead to subterranean passages, but they have not been explored. The idea of preserving the ruin, which was in a very neglected state, and likely soon to lose all trace of its original character, occurred to Dr. Bernard about four years ago, and it is a remarkable fact that the people, when appealed to for help to restore it, and informed of the antiquarian interest attached to it, cheerfully responded and gave their time and labor to promote the work without receiving any payment. Dr. Bernard pays a high tribute to their zeal and patience, observing that if they had been hired workmen they would hardly have shown as much obedience to their employers. He could not, in fact, have obtained such services for hire, for labor was not to be had. In the course of the excavations which were carried on a number of relics were turned up, which raise the antiquity of the place beyond question. It is recorded that the Grianan existed seventeen hundred years before the Christian era, and it is marked on Ptolemy's map in the second century, which was a copy of a much older map found in Alexandria. Among the relics were bones and teeth, defaced coins, the button and the socket of a plough, round stones with holes in the centre, war clubs, sling stones, a stone found in ashes marked into squares, another of dark color shaped like a heart, another with fluted columns, and a polished cone with flat base. Working under a heap of rubbish, the laborers came upon one of the platforms, thirty feet long, six feet wide, and five feet from the ground, and in the wall, which had almost crumbled away, four steps were found, which it was inferred led to another platform. There is a fort in the county Kerry, called Staigue Fort, which differs only in the platforms being a little longer. The completion of the work of restoration was celebrated by an entertainment given at the spot by Dr. Bernard. — *The London Times.*

NOTES AND CLIPPINGS.

A Favorite Mode of Retaliation. — We once told the story of the quarrels between two property holders in Cincinnati, caused by the trespass of one neighbor in building on a few inches of the land of the other, which lead to aggressions on the one hand and on the other until it resulted in one of them building a semicircular tower on his own land from whose windows he could spy out what transpired in the house of his neighbor. A course similar to this is about to be taken by a well-to-do San Francisco undertaker whose small property had been surrounded on three sides by a fence, said to be the highest in this country, which a millionaire had caused to be built, when he found that the undertaker was unwilling to sell his land, necessary to the integrity of the large garden which the millionaire was laying out. The undertaker endured the fence for a year or two, and made it useful and ornamental by training vines and trees upon it. At length tiring of passive resistance he has removed his old house to another part of the city, and is about to build in its place a tower, the lower five stories of which are to be plain and substantial, while in the upper stories it is said to be his intention to indulge in a mixture of Renaissance, Gothic, Babylonian, and Chinese architecture, — which we interpret to mean nothing other than our own vernacular architecture. The peculiar virtues of this fantastic mixture of styles as a means of torment are not very evident, and the propriety of this form of annoyance can only be explained by the possibility that the fence-building millionaire is an architectural purist.

Scaffold Accident.—We have noticed during the present month at least a dozen accidents, caused by the giving way of scaffolding, which often brought death to one or more persons. The latest accident of this nature took place at Newport, Ky., on August 14, where four men were seriously injured by the giving way of a temporary scaffold, which they were using while putting on a new roof at the Gaylord Iron Foundry. These accidents may be expected to occur until builders learn that the proper designing of a scaffold is a matter for serious study, and should be intrusted only to those who have made a study of framing and bracing.

The Quebec Improvements.—Queen Victoria has lately transmitted to the Governor General of Canada ten thousand pounds to be used in building one of the gateways in the city walls, which, in honor of the Queen's father, the Duke of Kent, is to be known as Kent Gate. The building of this gateway is one of the features of the scheme for improving Quebec which has been carried on under Lord Dufferin. It is said that the Governor General thinks that the Marquis of Lorne will build the Château St. Louis, views of which were published in the *American Architect* for April 14, 1877.

The Manchester Joiners' Strike.—The committee of the Manchester joiners, who conducted the affairs of the trade during the recent strike, which lasted fifty-three weeks, has made its final report. From this it appears that the strikers gained nothing, and that in addition to the $225,000 of their own funds which they expended during the contest, they also spent $40,000 contributed by other trade associations.

The Pompeian Sentinel.—The *Architect* speaks in high praise of the model of Miss Hosmer's colossal statue of the Sentinel of Pompeii now on exhibition in London, and particularly notices the thoroughly masculine character which has been given to it by the sculptress, the favorite pupil of the late sculptor Gibson. Miss Hosmer has chosen as her subject one of those legionaries who, common repute has it, refused to desert their posts, although they could see the lava flood descending on them. Whether the story is true or not there is in the Museum of Naples a suit of armor still inclosing the skeleton of its former wearer, and though it is in the style of a later day, it is pointed out as the confirmation of the legend, which is referred to by General Ambert, as follows: "Within the armor of the Musée Bourbon still remains the skeleton of a soldier, who was on guard before the barracks in the seventy-ninth year of the Christian era. For eighteen centuries has this man been inclosed in this envelope of iron. At the slightest blow the bones of the skeleton are shaken and strike against their metallic covering; hence the dry sound that brought us to a stand. The quarters of the soldiers alone were not deserted; the sentinel remained immovable resting on his spear. We took an interest in visiting this post of the soldiers of days long gone by, who gave so grand an example to the soldiers of our own days. The sentinel was on guard where he was stationed, and there he remained from November 23, A. D. 79, to April 20, 1794."

Chimney-Cowls.—It is said that the test of chimney-cowls lately made at Leamington, England, under the auspices of the Sanitary Institute of Great Britain, was not fairly conducted, inasmuch as the building used for testing was an isolated one, so that winds and currents of air came in a way wholly unlike the baffling and eddying currents that sweep down from surrounding houses upon the chimneys of a city, causing back draughts and other defects which it is the design of all cowls to remedy.

Sea-Water Baths in London.—A project for supplying London with sea-water is talked of, and though no actual company has been formed, an estimate of the cost of the undertaking has been prepared. As this rough estimate shows the probable cost to be between seven and eight millions, and as the consumers must necessarily be few in numbers, the undertaking probably will never be anything more than a project.

The Window-Tax and Restoration.—The anti-restorationists can hardly find fault with what is now doing at a place known, oddly enough, as the "Restoration House," at Rochester. The building, which derives its title from the fact that Charles II. slept there on his way from Dover to London, is a genuine Elizabethan house built of red brick, and having in plan the form of the letter E, a form which was common to buildings of that date. The present owner is opening out fifty-two windows on the front, which in the times of levying the window-tax had been stopped up with plaster to avoid the payment of it.

Le Prix Bordin.—L'Académie des Beaux-Arts has just awarded the *prix Bordin* for the year 1878. The prize is awarded to the writer of an essay on some topic suggested by the Academy. This year the programme was, "Discover the Theoretical and Practical Differences which exist between Engineers and Architects. Taking into account the advantages and the inconveniences of the division between the two professions, deduce from this study whether in the interest of art an absolutely determined division should be made, or whether there should be a complete fusion of the two professions." Seven essays were submitted, and the one bearing the motto, "Brought up in the seraglio I know its ins and outs," was chosen with unanimity. M. Davioud, one of the architects of the Palace of the Trocadéro, proved to be its author.

A Simple Fire Detector.—The Sacramento *Record-Union* says: "A device for indicating fire in any one of a series or suite of rooms has been made by drawing a long iron wire through all the rooms near the ceiling. One end is fixed to the wall, and the other is secured to a common house bell hung on a spring. In each room the wire is broken and the gap is closed by a small strip of gutta-percha. Under each piece of gutta-percha is a short slack piece of chain, so that when it melts the ends of the wire will still be held secure. In case of a fire in any room the gutta-percha melts (at one hundred degrees Fahrenheit), and the wire is drawn apart by a weight at the end where the bell is placed. This frees the spring, and the bell rings. The bit of chain prevents the weight from falling, and, as each room is provided with a different length of chain, the distance the weight has fallen records the room where the wire parted."

The Effect of Dynamite.—According to the *Revue Industrielle* Herr Fuchs, superintendent of the works of Alfred Nobel & Co., at Kruemmel, has recently made a number of experiments with dynamite, the results of which deserve to be more extensively known. The object of the series was to shew that dynamite is not exploded by such shocks as it may suffer during transportation. The tests were made as follows: (1.) A keg holding about five pounds of dynamite, when dropped repeatedly from a height of twenty feet upon the pavement, did not explode, even when it was thrown down violently by several of those present. (2.) A weight of twenty pounds falling from a height of twenty feet on a cartridge of dynamite lying on the pavement completely flattened the latter, but did not explode it. This same flattened cartridge, fired with the aid of a cap, tore a board into shreds. (3.) A keg holding fifteen pounds of dynamite was fired with a cigar. Its contents burned quietly without explosion or damage to the keg. (4.) A closed keg containing twenty-five pounds of dynamite was thrown into a fire, where it burned quietly. (5.) A tin box with lid attached, holding four pounds of dynamite, was similarly thrown into a fire and burned without explosion, while a similar box was lit by means of a fuse without a cap and was found to burn quietly.

An Electric Lamp.—The New York *Times* says that M. Reyner's new electric lamp seems to be as easily managed as an ordinary oil lamp. A rod of carbon, from twenty to thirty centimeters long and from one to two millimeters thick, is held at one end by a metal rod which tends to descend by its own weight, and at the other by a carbon wheel in a vertical position. The carbon is pressed strongly against the wheel, which is made to revolve slowly. A current of electricity from a battery of from four to six Bunsen elements raises the carbon to a white heat at the point of contact of the rod with the wheel. A splendid light is produced. If a high degree of luminosity is required, the heated portion of the carbon may be increased at pleasure. Break the current, and the lamp is extinguished. Restore the connection by turning a knob, and the light flashes forth. The battery may be stowed away anywhere, and any one can use this illuminating contrivance in a house or work-shop without being annoyed with the difficulty and expense of maintaining any magneto-electric machine or steam-engine.

The Olympian Excavations.—During the past three winters German explorers have brought to light at Olympia: 429 inscriptions, 901 marble objects, and the same number of terra-cotta objects, 1270 coins, and 3734 bronzes. Photographs of the important ruins have been made, and many casts taken. The third volume of the official report will be published shortly.

Architectural Missionary Work.—The chances for architectural missionary work which, as we lately said, are continually offering in Africa and Asia, are very markedly exemplified in what is at present going on at the site of Babylon. Here, as a correspondent of the *Times of India* says, antiquarian remains are destroyed continually by the Arab workmen, with the cognizance if not with the expressed consent of the Turkish Government, who are sufficiently aware of the value of the remains discovered to interdict strictly all researches by Europeans at Nineveh. The correspondent says that the modern town of Hillah is built, though poorly, of bricks of Babylonian make; for instance, he says: "The court-yard of the house in which I stopped was paved with large square bricks, every one of which bore the honored name of Nebuchadnezzar." Native brick merchants save themselves the trouble of making bricks, by repairing to the site of the ancient city where they can obtain bricks already made — and nearly every one of them stamped with the name of some Babylonian king — by digging trenches more or less large and deep, until some of the ancient walls are reached. No record is kept of the remains discovered, nor are any plans and drawings made, and it is only too probable that when the time comes, as it surely will come, when it is possible to undertake the disinterring of this perished city, there will be lamentably many needless gaps in the archæological record then developed. It is just possible that as England has lately assumed the protectorate of Turkey the grateful Mussulmans may be willing to concede to English hands the interesting task of determining so far as may be the fate of Babylon. We hear, too, that Dr. Schliemann will resume his researches in the Troad if he can obtain the necessary firman, and a Turkish guard strong enough for his protection.

Niello.—According to the *Berliner Tageblatt*, the firm of F. Zacher & Co., in Berlin, have discovered the method of manufacturing the Russian tula or Niello silver, the real composition of which has been guarded hitherto as a secret, and have made it in large quantities. It consists of nine parts silver, one part copper, one part lead, and one part bismuth, which are melted together and saturated with sulphur. This mixture produces a gorgeous blue which has often been erroneously spoken of as steel blue.

Novel Lightning-Rods.—It is said that the peasants in the village of Tarbes, in the Hautes-Pyrenees, discovered that a bundle of straw fastened to a stick and placed upright on the roofs of their cottages formed an effectual protection from lightning during the thunder-storms common to the district. It is further said that the knowledge of the custom spreading, there are now some eighteen or more communes in which all the cottages are protected in this way.

Irish Architecture.—Miss Margaret Stokes is republishing her essay on "Early Christian Architecture in Ireland," which was originally prefixed to Lord Dunraven's "Notes on Irish Architecture."

A Long Entr'acte.—The following announcement has been circulated lately at Pompeii: "After a lapse of more than 1800 years the theatre of this city will be opened with 'La Figlia del Reggimento.' I solicit a continuance of the favor bestowed on my predecessor, Marcus Quintus Martius, and beg to assure the public that I shall make every effort to equal the rare qualities displayed during his management."

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CONTENTS.

SUMMARY:—

The International Congress of Architects at Paris. — Discussion on the Desirability of Establishing Architectural Diplomas. — The Action of the Congress in the Matter of Architects' Fees. — Appointment of an International Committee to consider Public Competitions — The Insanitary Condition of Baltimore and some other Southern Cities. — The Cause of the Yellow Fever at Grenada, Miss. — The Chance that the East River Bridge will remain uncompleted or be removed. — General Opposition to the New Scheme for Decorating St. Paul's, London. — The Discoloration of some London Buildings caused by Lichens. — The Introduction of the Metric System Discountenanced by the Government departments . 69

PAPERS ON PERSPECTIVE. XII. 71

MODERN PLUMBING. VII. 73

THE OFFICIAL REPORT ON THE PATENT OFFICE COMPETITION . 75

THE ILLUSTRATIONS:—

The Patent Office, Washington, D. C. — Design for a Town Hall. — Study in Perspective 75

VENTILATION OF SEWERS AND DRAINS 76

CORRESPONDENCE:—

Letter from New York 77

BARTHOLDI'S STATUE OF LIBERTY 77

THE HIEROGLYPHICS ON CLEOPATRA'S NEEDLE 78

COMMUNICATIONS:—

Questions in Sewer Ventilation. — The Studies of an Architect 79

NOTES AND CLIPPINGS 80

THE most important event of the day, so far as the general interests of architecture are concerned, is doubtless the assembling of the International Congress of Architects at Paris. The business of the Congress seems to have been managed in a manner very different from the more democratic and parliamentary methods to which we are accustomed. There was no form of electing officers, no delay in effecting an organization, no appointing of committees, no visible machinery, excepting that exhibited in the indefatigable energy of M. Charles Lucas, the secretary of the Société Centrale, who was the impelling force, and in the dignity of M. Lefuel, president of the Société Centrale, who was the decorative head and front of the proceedings. The programme of the Congress embraced two daily sessions, one in the morning at the Tuileries, devoted to the reading of papers, and one in the afternoon at the Palace of the Trocadéro, devoted to discussions. The proceedings occupied six days. On the first day (July 29th), after a brief introductory address by the president, the Congress was opened by the delivery of an essay by M. Hermant, vice-president of the Société Centrale, on "Natural Æsthetics," in which he endeavored to prove that, as the comprehension of the beautiful is a faculty common in a greater or less degree to all mankind, the ideal civilization requires a system of common education which shall be devoted more directly than hitherto to the development and cultivation of this faculty. The second day was given up mainly to speeches and discussions by members of various nationalities on the position of the architect as a professional man; the third to the consideration of the subjects of "Architects' Charges" and "Workmen and their Organization;" the fourth to a visit to Rheims; and the fifth to discussions on Public Competitions. The sixth and last day was occupied by the distribution of medals of honor awarded by the Société Centrale, these being in four classes: the first given to architects for the best series of works for five years, the second to students for the best series of designs, the third to contractors and skilled workmen for conspicuous qualities in their departments, and the fourth to manufacturers of special decorative materials for architectural purposes. The Congress terminated in the evening with a grand banquet and concert. The attendance was very large, and architects were present from every civilized nation of the world excepting the United States. The peculiar interest of the occasion was of course in the participation by architects of many nations in discussions of important professional topics, rather than in the resolutions which were passed by the Congress, which, from the nature of the case, were on the whole rather colorless and conventional in character. It is to be hoped that on the next similar occasion American architects will not again be conspicuous by their absence.

THE discussion on the professional position of the architect turned mainly on the question as to the practicability of creating and maintaining a higher professional standard by the establishment of some system of diplomas. The testimony of the French architects upon this point was apparently without exception favorable to the compulsory exclusion of all who should fail to earn and hold such a diploma; at the same time architects from Denmark and Russia maintained that the establishment of a system of exclusion by diplomas, as practised in those countries, had not been productive of any especial advantage to the profession. On the part of England, Mr. R. P. Spiers explained that the present development of architecture in that country had been practically accomplished without the assistance of schools or diplomas, tuition being obtained by a system of apprenticeship in offices, imperfectly supplemented by evening classes, lectures, and schools, established mainly by the Royal Academy and by the Architectural Association, but a very small proportion — not more than twenty or thirty per cent. — of the students availing themselves of such means of completing their education. In the absence of academic discipline fortified by examinations and certificates of proficiency, as on the Continent, English art had been particularly sensitive to influence from literature; and the works of Scott and Thackeray, Pugin and Ruskin, Stuart and Revett, had largely assisted in creating a succession of historical revivals. But this freedom from conventional restraint had developed such marked architectural individualities as Barry, Scott, Cockerell, Street, Burges, and others too numerous to mention, each being the leader of a school contrasting with the rest in many essential particulars. Mr. Spiers then endeavored to explain the cause of the contemporary "Queen Anne" revival, and neatly expressed his conviction that a purer style would soon prevail, and that the works of Due, Dubau, Labrouste, and Vaudoyer would be accepted as models by the English architects. The resolutions following upon this discussion called upon the French societies to unite as far as possible with foreign societies in studying and deciding the question relating to the giving of diplomas to architects.

THE most interesting point developed in the discussion of the third day, on architects' charges, was the fact that the five per cent commission in France includes not only the items usually accepted in English and American practice, but also the computation of quantities; and it further appeared that the French architect, unlike the English, but like the American, is accustomed by preference to employ different contractors for the different departments of the building. The French percentage, according to the scale of charges fixed by the Council of Public Buildings, is divided as follows: "Drawings of every kind, 1½ per cent; superintendence of work, 1½ per cent; quantities and specifications, two per cent; making a total of five per cent" The German scale of charges, as set before the meeting, varies, according to the nature of the building to be executed, from three per cent to seven per cent. This scale has been adopted by the Belgian Architectural Society and by that of Marseilles. This arrangement, however, was condemned as dangerous, and as leading eventually to legal complications, a result which the establishment of a scale of charges is intended to avoid. After an animated discussion, carried by adjournments through three sittings, the Congress, not unanimously however, arrived at the following extraordinary resolution: "This Congress, recognizing the principle of the liberty of artistic work and its free remuneration, of which the foundation should be based on the *economical principle of supply and demand*, considers that each architect has the right to adjust the value of his services according to his own estimate of what would be a just recompense for his talent, taking into account the special difficulties which may arise in each case." This resolution is doubtless based upon abstract justice, but, owing to the imperfection of human nature, it would obviously remove from the practice of the profession its only protection against the worst evils of a competition of prices. It is true that this protection, as at present devised, is clumsy and apt to work gross injustice in especial cases, but it is the best we have, and, under the circumstances, should have been amended in its details rather than entirely abolished. This view of the

case, it seems, was practically recognized in a supplementary resolution, suggesting that in the absence of any preliminary arrangement the French scale of charges as above quoted "might be taken as a minimum, steps being taken meanwhile to ameliorate this document and augment the scale in consequence of diminution in the value of money."

On the fifth day of the International Congress the regular business related to public competitions, and the debate was on the following resolutions: "First. That the Minister of Public Works be requested to recognize the system of public competitions throughout France, and to place them on a basis which would give satisfaction to the interests of artists, the common welfare, and the requirements of state administration. Second, That the basis should consist of a series of rules defining the establishment of a programme and the nomination of a jury consisting of architects, instead of leaving the selection and judgment to the prefects and mayors." The English delegate considered the last provision inexpedient, and laid before the meeting the programme of the Royal Institute of British Architects, in which the utmost demanded is the appointment of an architectural assessor to draw up the programme in each case and advise as to the choice. The Russian delegate advocated the resolutions, and contended that the competitors should be allowed to appear before the architectural jury to "explain their own designs and criticise the others." The delegates from Madrid and Copenhagen complained of the irregularities in public competitions in their own countries and of the usual incompetence of the judges. The resolution was passed, and a committee, one third of which is to consist of four foreign delegates, — Russian, Spanish, Danish, and English, — was appointed to consider the subject. The American delegate, if present and well posted in the picturesque incidents of competitions in our own country, might have supplemented the evidence of his brethren from Madrid and Copenhagen, and added a chapter of experience undreamt of even in their philosophies.

Not many years back the fever-plague that is now desolating parts of the South would have been accepted as an inevitable occurrence; but now, when the laws of hygiene are better understood, it is easy to see that yellow fever, being probably a filth disease, is a preventable one. That it is a filth disease is shown by the circumstance which, we believe, gave rise to the yellow fever at New Berne during our late civil war. Certain officers there encamped, desiring to have a flower-garden in front of their quarters, had the soil turned up and seeds planted. Unfortunately the soil had been polluted by the slops from a regimental camp kitchen which formerly had been established there, and no sooner was the soil disturbed than yellow fever declared itself. This being the case, there are cities and towns in the South which are rapidly preparing themselves to be hospitable entertainers of the dread disease. The citizens of Baltimore for instance, in many cases still drink water from unclosed wells, no one of which, say the sanitary authorities, is free from sewage contamination. How could they be otherwise in a city where, until within a few years, there was but a half mile of sewer; and this only for rain-water; where all sewage was stored in cesspools, a large proportion of them made only of wood, so large, too, as rarely to cry for emptying; and where all the kitchen slops and bath waste are discharged over the sidewalks into open gutters, through which they sluggishly flow until they discharge themselves into the Basin, a pool almost in the heart of the city, where the tidal variation is but slight, and whence arises, as we remember it, a most noisome stench, even in the winter time? Up to this time Baltimore owes its exemption not to sanitary precaution, but to the tremendous thunder-storms, which occur so frequently during hot weather as to keep streets and gutters fairly clean. Complaints are heard, even now, from Philadelphia, where the odor arising through the openings into the sewers at the curbstone level is making itself a dreaded nuisance. Charleston, on the other hand, of all Southern cities, is said to be least afflicted during yellow fever epidemics, thanks to a system of sewerage said to be exceptionally good.

The story of the sorely stricken little town of Grenada in Mississippi is just what one would expect, and the deaths, plundering, and negro license and violence are but the just results of culpable neglect of the common laws of hygiene. It is sought to account for the first case of the fever in this town of twenty-two hundred inhabitants by the fact that the lady who was the first victim had just received and worn a new dress made in New Orleans, where the disease was already developed. As the manner in which the disease is propagated is not yet understood with absolute certainty, we cannot say that this was not the case, but circumstances were such that fever may easily have had its inception in the town itself. The sewer of the town, such as it is, is said to be merely a ditch sunk a few feet below the surface and covered ostensibly with planks, which are overspread more or less thinly with earth. Into this practically open drain is discharged the overflow of most of the cesspools and privies of the town, including those of several hotels and a female seminary, as well as the drainage from barns and from a large livery stable. The existence of the drain is ever asserted by the odors which arise from it, and these do not lose in strength whenever a pig, the only scavenger of some Southern towns, chancing in search of food to wander into it through some opening, gets wedged in and thus perishes miserably. Early in July the smell from the sewer had become such a nuisance that it was opened, and it is said that the carcasses of several hogs were found in it. The dress from New Orleans may have introduced the fever, but it should be noted that the lady who died on the 25th of July, while the sewer was still open, lived only a short distance from this freshly-opened drain, and that the fever, once introduced, followed with particular malignancy the course of this sewer, the cases being more frequent here than elsewhere, and resulting fatally within shorter periods. In the face of such statements as these it seems hardly necessary to search curiously for extraordinary causes.

A private citizen, a naturalized alien moreover, has been able to accomplish in Philadelphia a reform which one would think a governing body would be eager to initiate and carry into execution without waiting for a bribe of any form. Stephen Girard, to whom Philadelphia owes much, left a bequest of five hundred thousand dollars, which was to be applied first to opening Delaware Avenue, then to widening Water Street, and lastly to purchasing all the wooden buildings in the city with a view to their abolishment. To the State of Pennsylvania he bequeathed three hundred thousand dollars for canal improvements, with the condition that the Councils of Philadelphia should be authorized to prohibit the construction of any more wooden buildings in that city. This condition was acceded to, and since, in 1836, the Councils passed the prescribed ordinance, no wooden buildings have been erected in the city. Delaware Avenue has been opened and Water Street has been widened, yet the original bequest remains intact, for the managers of the Girard Trust have effected these improvements out of the interest accruing from the bequest. Now they are prepared to execute the third commission of the bequest, and have informed the six hundred owners of wooden buildings in the city that they stand ready to buy their old tenements at a fair appraisement. Some owners have been only too glad to come to terms, and are now rebuilding in brick. Others, seeking to obtain a price out of all proportion to the value of the building to be destroyed, have refused to sell, and as, unfortunately, there is no law which empowers the managers to force a sale, operations are brought to a stand in some directions. But the change must be effected in time, and the obstructive owners are only dallying with the inevitable. If in the future Philadelphia escapes conflagrations as disastrous as those which have twice swept over Chicago, she will owe it, even more than to her wide streets, to the shrewd foresight of Stephen Girard, and his strong common sense and mercantile instinct in perceiving that even when dealing with bodies politic it is best to have a *quid pro quo*. It is interesting on the other hand to note that Chicago, in spite of the severity of her lessons, does not yet "dread the fire," but has been considering lately the advisability of contracting her fire-limits.

The Board of Aldermen of the city of New York has voted to sustain the Comptroller in his refusal to contribute any more money towards the completion of the great East River Bridge, connecting the cities of New York and Brooklyn. This important action of the city government is based upon the facts that the limit of expenditure ($5,000,000), as established by law, has already been exceeded; that the city has already contributed $3,500,000, which is more than her legal quota; that the structure, if completed, will destroy fifty per cent of the value of the ferry franchise, one of the most important held by

the city, and one for the interference with which no compensation has been provided, or will be made; that it is and will be a serious obstruction to the navigation of the East River; that, because of such obstruction, the United States authorities may at any time order the removal of the bridge (indeed, a suit to that end is even now pending); and finally that the safety of the structure is gravely questioned by competent authority. It seems probable that the work on the bridge will not be resumed until the questions as to the liability of the city and the obstruction to navigation shall have been finally decided, and until the exact amount required to finish the work shall have been ascertained and its safety assured. According to the present aspect of affairs, therefore, this looks like an indefinite postponement of the whole enterprise, and meanwhile the stranger from beyond the seas, as he approaches the metropolis, will have pointed out to him the mighty towers of the bridge, with their unfinished slender threads of connection and their incomplete approaches, and will begin his notes on America with some pertinent reflections on the precipitancy of the national character and our tendency to undertake great works without duly counting the cost; a first impression, we regret to say, not likely to be weakened by subsequent observations and wider experience.

The proposition to begin the long-considered work of decorating the interior of the Cathedral of St. Paul's by a costly experiment in the dome, as we have already explained in this journal (see *American Architect* for August 10th), meets with a vigorous opposition in many of the English papers. This opposition is directed not only against the great cost of the undertaking as compared with the results to be obtained, but against any effort which might tend to make a mere show-house of the great temple. But the criticisms which more immediately concern us, as architects, are those which take exception to the manner in which it is proposed to carry out this monumental enterprise. The subdivision of the domical surface into sections by *apparent* ribs *apparently* supported by figures (tabulones) *apparently* projected from the surface is considered an offence against the fundamental principle of truth in art, and a disregard of the obvious intentions of Wren, who, if he had wished such an architectural subdivision, would have provided for it by contriving actual ribs in the stucco finish, which he so well understood how to use. The treatment of the dome by Sir James Thornhill, probably carrying out the modified scheme of decoration as approved by Wren, and virtually having its figures within and beyond the surface and not *appliqués* upon it, thus *apparently* enlarging the cope instead of diminishing it, is deemed much more in accordance with the architectural conditions. Attention also is drawn to the fact that the scheme, as proposed, does not recognize the great plain surfaces of the drum or tambour of the dome above and below the Whispering Gallery, and, instead of including these important spaces, so much nearer the eye, leaves them bare and subject hereafter to the dangerous chances of adjustment to the finished work above. It is claimed, moreover, that the first experiment should be made, not in the part which demands the highest art and the greatest experience in decorative effects, but in the choir, which presents conditions far more familiar to the artist, and which may consequently be treated with better chances of success, thus educating the hands and eyes of those engaged in the work to a better appreciation of the more difficult parts, especially of the culmination of the decorative problem in the dome. The whole discussion, though covering a very high region of artistic thought, is maintained with vigor and earnestness, indicating that the literary as well as the professional circles in the old country are thoroughly interested and capable of intelligently considering the achievements and due position of the nation in respect to its monumental art.

The smutty appearance of buildings in London has always been ascribed to the smoke and soot of the metropolis, but those who remember the different degrees of blackness with which St. Paul's is disfigured, without any apparent cause, will not wonder that science has been led to seek, and has apparently found, another explanation of the phenomenon. Investigation showed that buildings in Bath, constructed of a similar oölitic stone, were besmutted in a like manner, while in Wolverhampton, one of the smokiest of English towns, churches and buildings of sandstone were unstained. Clearly, then, if smoke affects masonry at all, its influence must be confined to certain limestones. The discovery of a certain rusticated Italian wall in Cambridge so far out in the country that smoke could not have affected it, which was yet covered with the same blackness which so disfigures the northern side and the lower portions of St. Paul's, led Professor Paley to the belief that smoke was not the cause of the disfigurement, but that it was caused either by some vegetable growth, or by some oxidation that was not understood. Careful investigation by analysis and by the microscope seemed to show that the discoloration was caused by minute lichens, amorphous in form and of extremely low organization, shunning light and warmth and possessing the power of extracting its necessary sustenance from limestone. Of this fact there seems to be no doubt, for those parts of St. Paul's, the best known example of this discoloration, which are exposed to the full light and warmth of the sun's rays still show the original whitish color of the oölitic stone, while those parts on which sunlight never falls, the soffits of the cornices, the under sides of mouldings, the north sides of window jambs and vertical mouldings, and a great part of the north side of the building, are stained and streaked with various shades of blackness. On the north side indeed there are whitish streaks and patches, which observation has shown to coincide with those parts on which the oblique rays of the setting sun fall at certain seasons of the year. If these conclusions are tenable, the proper step to take for protection against this lugubrious parasite is to discover some way of treating the surface of a building by chemical washes so that the lichen cannot attach itself nor feed upon the stone.

In accordance with a resolution passed at the last session of Congress, the Heads of the Departments have been generally requested to state what objections, if any, existed to the introduction of the metrical system as obligatory in public and private transactions respectively. It is well known that the system has already been legalized by Act of Congress. The replies which have been received from the several Departments are significant of the very serious obstacles which this proposed reform is destined to encounter. The Navy Department pointed out that as regards naval affairs an obligatory change in this respect would "involve a total loss of all charts and chart plates now in use," the soundings thereon being given in fathoms and feet, as in the case of all English charts. The Postmaster General's objections were not of a serious nature, and did not touch any fundamental points; indeed, it would seem that the gradual introduction of the metrical system could be effected through the Post Office more conveniently and with less disturbance than in any other Department of Government. The State Department maintained that in dealings with foreign countries the disadvantages of the change would, on the whole, outweigh the advantages. In the War Department the change was very strongly opposed, especially by the Quartermaster General, on the ground that it would greatly increase the labor of computation and the chances of error; that it would involve great expense in change of scales, weights, and measures, and great confusion and misunderstanding, until the metrical system had become thoroughly naturalized not only among government officials but among individuals in all parts of the country. He was of opinion that Congress had no power to render the system obligatory in private transactions, and maintained that the meter, not being, as was originally supposed, exactly the ten-millionth part of the quadrant of the meridian of Paris, is "quite as arbitrary and unscientific a standard as the foot or yard." Evidently, however, the Government must make the first practical move in this matter; but, as it seems to us, this move should be made very gradually and in concert with Great Britain, the only important commercial nation besides ourselves which still holds to the old standard. Without such concert, the difficulty of the transition would be more than doubled for either. A simultaneous adoption of the metrical standard in the post offices of the two countries, for example, would apparently introduce it with the least embarrassment and with the best opportunity for rendering its usage and its values familiar to the public.

PAPERS ON PERSPECTIVE.

XII. DISTORTIONS AND CORRECTIONS. — FIGURE PAINTING.

254. It has been pointed out in the previous paper that the perspectives of circles often look very queer; the ellipses by which they are represented seem unaccountably and even unnaturally inclined, their principal axes slanting in directions difficult to anticipate. The effect of this is particularly objectionable when the circle is horizontal or when it forms the base of a cylinder. The base of a cylin-

der always presents the appearance of an ellipse whose major axis is at right angles with the axis of the cylinder, and it is offensive to find it drawn otherwise, as in perspective often happens.

255. A horizontal circle always appears to the eye as a horizontal ellipse, as an ellipse, that is to say, whose major axis is parallel to the horizon and whose minor axis is perpendicular to it, and it is extremely obnoxious to see it drawn with the axes inclined. This is illustrated in Fig. 58, by the perspective plan of the capital at the top of the figure and that of the base at the bottom. The effect of this would be so disagreeable if the curves of the capital and base were inclined in like manner, that it is customary to introduce a certain *correction*, as it is called, as is done in the figure. These lines are drawn as horizontal ellipses, just as if the object were at the centre of the picture.

256. Fig. 59, *c*, still further illustrates this point, showing that in the column at the centre of the picture the ellipses are horizontal, and that the others are more and more inclined as they are farther removed from it, which looks like an unnatural distortion. In this figure, moreover, the outer columns, which as seen from the station-point at S would look the smallest, since they are farthest from the eye, are on the contrary drawn larger in diameter, an apparent distortion even more offensive than the other. So with the spheres by which the columns are surmounted. The outline of a sphere always looks like a circle; it is not agreeable to find it drawn as an ellipse. But in perspective it must always be an ellipse, unless its centre is just at the centre of the picture; for the perspective representation of the sphere is the section of a right cone with a circular base, and it must always be an ellipse unless the axis of the cone is perpendicular to the plane of the picture.

257. Of course all these distortions disappear when the eye is at the station-point, at a proper distance in front of the picture, opposite the centre C. From that point of view the perspective lines exactly cover and coincide with the outlines of the objects. But practically it is impossible for the spectator always to be exactly at the station-point, and since from every other point circles, cylinders, and spheres appear, in general, to be more or less distorted in the manner we have just seen, it is customary here also to apply corrections. These corrections are palpable violations of the rules of perspective made in order to avoid the disagreeable consequences of deserting the station-point. They consist in drawing all horizontal circles as horizontal ellipses, whether opposite the centre of the picture or not; in always drawing the elliptical representation of the base of a cylinder at right angles with the cylinder itself; and in drawing all spheres as circles. If a row of columns, moreover, is parallel to the picture, they are always made of the same diameter, as if seen in elevation, and if their direction is slightly inclined to the picture care is taken to diminish their width a little as they recede.

258. Fig. 59, *c*, illustrates these corrections, and shows further how the same treatment is sometimes extended to the octagon. The right-hand side of the octagonal figure at the top is drawn steeper than it ought to be, not being directed to its proper vanishing point, in order to remedy the apparent distortion seen in the corresponding figure below.

259. Fig. 59, *c*, shows also the effect of applying to vertical circles and semicircles the same corrections as to horizontal ones. The circular window which in the figure below is drawn in true perspective as an oblique ellipse is here shown as a vertical one, a change which will probably be regarded by most persons as an improvement. The effect of a similar correction in the semicircular-window head beyond is less happy; it makes the nearer half look much too big and obviously throws the imposts, or points where the arch begins, quite out of level.

260. Since these so-called corrections change and generally diminish the apparent size of the circles, cylinders, and spheres to which they are applied, the relation of these objects to other objects is necessarily changed at the same time. In the first place, more of the background has to be shown than can really be seen. In the figure, for example, the openings between the columns are increased, and objects are seen beyond which in point of fact would be hidden. This discrepancy is not very important and in general would hardly be noticed, but the altered relations between these circular figures and other objects in their immediate neighborhood is a more serious matter. The square abacus between the shaft and the sphere that surmounts it looks too big for its place if left without correction, and looks smaller than its fellows if reduced as the sphere and cylinder are. So also when an octagon occurs in immediate connection with a circle. If its shape is adjusted to that of the *corrected* ellipse its want of harmony with the rest of the drawing often becomes painfully apparent. A satisfactory adjustment may sometimes be effected by a compromise, the ellipse being made not quite horizontal and the octagon or square being not quite harmonized with it. But a perfectly satisfactory adjustment is in some of these cases, and notably in the case of a row of columns, almost impossible.

These difficulties are of course greater as the objects in question are further removed from the centre of the picture, and may be diminished or removed altogether by so taking the position of the picture and that of the spectator that the circular object is at or near the centre C.

261. Although the distortions of circular and spherical objects are, in general, the only ones that call loudly for correction, and it is to them alone that correction is systematically applied, it is obvious that a similar distortion must exist for all objects equally distant from the centre of the picture, the so-called distortion consisting in this, that the shape of the object in the drawing is different from the shape which the real object presents to the eye. This is in fact implied in the fundamental principle of perspective, the principle that a perspective drawing will look right from only one point, namely, the station-point. Now as from the station-point every part of the picture except the centre is viewed obliquely, *askance*, as it were, everything *must* be drawn of a different shape from what it appears in order that when the drawing is looked at thus obliquely it may appear as the object itself does when looked at directly. By the very theory of perspective only the object just opposite the eye, seen along the axis of the picture, just at its centre, is drawn as it looks. Everything else is, so to speak, distorted. The outline given to it is not its real outline, but one which will look like its real outline when seen sideways from the position assigned to the spectator. This distortion is inevitable, and every object in a perspective drawing, except the one at the centre, is always distorted.

262. The disfigurement produced by this does not of course become very obvious, except for circles and spheres, so long as objects are not far removed from the centre, that is to say, so long as the picture is of moderate extent. The limit commonly assigned to a perspective drawing is sixty degrees, that is to say, the width of the picture should not be greater than its distance from the station-point. But this implies that the centre C is in the middle of the picture, which as we have seen is often not the case, and it is better to say that no part of the picture should be distant from the point opposite the eye more than half the distance of the spectator in front of it. But even within this range the distortion even of rectilinear objects is sometimes intolerable, and great caution must always be used in regard to objects situated at the edges of the picture.

263. This limit of sixty degrees is obviously an arbitrary one, and only means that by the time it is reached the distortion begins to be noticeable. It is foolish to say, as is sometimes said, that this is fixed because sixty degrees embrace all that one can see without turning his eyes, or as others say, without turning his head, and that this is accordingly the natural range for a picture. For one has to turn his eyes, more or less, to see directly anything larger than a pinhead, held at arm's length; and he has no need to turn his head to embrace a horizon of ninety degrees. Besides, why should not one turn his head as well as his eyes in looking at a picture as well as in looking at nature? If he is at the station-point, where he ought to be, turning his head cannot make things look wrong, and if he is not there keeping it still will not make them look right.

264. What has been said of cylinders and spheres strictly applies to the human figure, which may be regarded, in a rough way, as a cylinder surmounted by a sphere. Perspective distortion is here even more intolerable than in the case of the more exact geometrical solids, and the need of correction is more imperative.

This is excellently illustrated by the phenomena of the familiar parlor amusement called "Chinese Shadows," in which a sheet is hung across the middle of a room and the shadows of the performers on one side are thrown upon it for the entertainment of spectators on the other side. A single lamp is used, and it is obvious that all the shadows except the one just opposite the lamp and on a level with it must be more or less distorted as they are more or less removed from this centre. But it is also obvious that if one of the spectators places himself exactly opposite the lamp and as far in front of the screen as the light is behind it, the distorted outlines will be foreshortened into the true shape of the figures on the other side as seen from the place occupied by the flame.

265. A historical picture then, if painted in true perspective, with all its figures so drawn as to present their true aspect to the spectator standing at a given point in front of it, would have all its personages as much out of drawing as are Chinese shadows upon a screen. Fig. 60, which exhibits the results of an experiment with a group of statuary and with half a dozen round balls, illustrates these conclusions.

266. No such picture of course was ever painted, painters always adopting the same course for figures that has been recommended for their geometrical prototypes. Every figure is outlined independently of all the others, and in its natural proportions, just as if it occupied the centre of the picture. In order to see it correctly the spectator has to stand opposite to it, and as he cannot of course stand exactly opposite to more than one figure at a time, it follows that he can never see more than one at a time in correct drawing. All the others are distorted by fore-shortening. But if he is at a distance from the picture this distortion is not noticeable, and when he comes near he confines his attention to the figure nearest his eye.

This is very well illustrated by Raffaelle's famous fresco called the "School of Athens," of which the principal part is shown in Fig. 61. The figures on the extreme right and the spheres which they carry are drawn, as has been pointed out by M. Adhemar, just as if they were in the centre of the picture, opposite the eye. If the spectator were in the middle of the room, one wall of which is occupied by this picture, the chief one of these figures would appear foreshortened, as in Fig. 61, *a*, the sphere looking like an egg on end. One sometimes in the scenery of a theatre sees a round ball on a post present a similar aspect, from the same cause. In order to make the figure appear as it should, to make it assume when seen from the middle of the room, the form intended by the painter, he would have

had to draw it as shown in Fig. 64, *b*, giving the sphere a flattened form, just as in Fig. 59 *c*.

267. If his picture is a large one, the painter often has a difficult task to reconcile his background and accessories, which are drawn according to perspective rule, and calculated to be seen from a single point, with his figures, which utterly violate these rules, and permit and indeed require the spectator to regard them from half a dozen different positions. The background proper may not give much trouble. More of it will be seen between the figures than would be the case in nature, as has been pointed out already, in regard to columns, and care must be taken not to use any forms which require the spectator to remain exactly at the station-point; for this he will not do. But that can easily be managed. The chief difficulty is found in fitting the figures into the foreground. If a chair, for instance, occupies one end of the front of the picture and is put into perspective along with the walls and floor, so as to appear correctly from a point opposite the middle of the picture, it must needs look more or less crooked when looked at from a point opposite the end of the picture, and it is no easy matter to make a figure painted from that point of view look as if he were seated comfortably in it. If, moreover, he is to be represented as looking straight across the picture, it is by no means clear whether he should be drawn in profile as he would appear from this point, or with the three-quarter face which he would show from the other.

268. There is even greater difficulty in reconciling the perspective of a floor with the want of perspective of the feet that stand upon it. If a number of persons are shown in the foreground of a picture all facing the same way, it is impossible to make the direction of their feet agree with that of the boards on which they stand. Fig. 61, *a*, shows how the feet of a dramatic company, seen just as the curtain is descending, would be drawn in true perspective, agreeably to perspective plan below. Fig. 62 shows the necessary correction, each pair of feet being drawn just as if it were exactly opposite the spectator. But it is to be noticed that the end man is necessarily represented as standing diagonally across the floor boards.

269. In general, the attitude of the figures at the edge of a large picture is not very clearly defined, and varies as the spectator changes his position. In Guido's "Aurora," for instance, if one stands opposite one end of the picture the figure at the extreme left seems to be marching along the front, and Aurora herself to be looking out of the frame. If he goes to the other end she seems to be looking back at Apollo in the chariot, and the other figure seems to be just coming round the corner, so to speak, from behind his car.

Another difficulty in the perspective of figure subjects is, that if the figures are as large as life everything nearer than they becomes colossal. But this may be avoided, and generally is, by not having anything in particular in front of the principal figures.

270. All the difficulties encountered with the human figure are met in even greater force with figures of animals, except that it is possible for them to be considerably out of drawing without detection. Fig. 65, which is borrowed from the work of M. Thiébault, illustrates at once the extent of the distortion and the difficulty of correcting it.

MODERN PLUMBING. VII.

WATER CLOSETS. 1.

ALL the forms of water-closet now in use may be reduced to four types:—

First, the hopper, which is a conical basin with outlet at the bottom, inserted into the mouth of an S-trap.

Second, the valve-closet, properly so called, which consists, in substance, of a hopper with a door closing tightly the outlet, so that a body of water stands in the basin, kept up by the door or valve, until a lever is pulled, which causes the valve to drop and the water and other contents to escape together.

Third, the pan-closet, in which the lower orifice of the basin, instead of being closed by a valve, dips into a pan hinged at one side and filled with water, which is dropped by the action of a lever, and the contents thrown out into the receiver in which the pan works, and thence pass to the drain; and

Fourth, the plunger, or side outlet closet, in which the outlet from the basin runs sideways, far enough to allow it to be closed by a plug working vertically by the side of the basin, which holds the water in the basin until lifted, when the discharge takes place below it.

Hopper or cottage closets are commonly made of cast-iron, enamelled inside, but earthenware is also used, or sometimes an earthenware basin is set in the mouth of a short iron hopper. The earlier shape was nearly conical, but it is found that the action of the flushing water, entering at the side and descending spirally, is more uniform if the sides of the hopper are curved, as in the Philadelphia or the Mott patterns. The lower end of the hopper may be inserted into a lead trap and the joint filled with putty, or it may be bolted to a cast-iron trap by the flange left for the purpose. This is the usual way, and the traps are cast with a removable cover, for cleaning out. An arm is cast on the hopper near the top, into which the supply-pipe is inserted, the joint being made tight with putty, and the water is admitted by any kind of stop-cock or valve. This makes a strong and simple apparatus, suitable for the use of persons who cannot be trusted with the better kinds of water-closet; but the sides get smeared with filth, and the contents of the trap float directly under the orifice of the bowl for hours or often days at a time, so that there is usually more or less smell from it; hence it should be placed in a well-aired situation, or the bowl should be ventilated in some way.

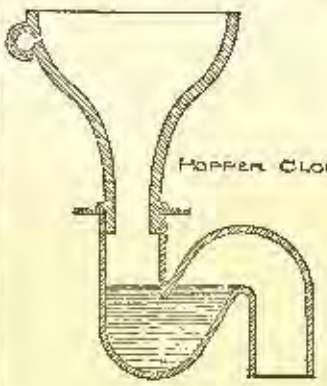


Fig. 1.

Ventilated hopper-closets are made by N. G. Tucker, of Worcester, Mass., R. D. O. Smith, of Washington, D. C., and perhaps by other parties, besides a ventilated hospital hopper by W. S. Carr & Co., of New York. It is not difficult to drill the shell of the ordinary kinds and insert a brass nipple for connecting a pipe for ventilation. Such ventilating pipes are best carried to an independent outlet, and not into a chimney, unless a separate flue is built for them; but they are far less objectionable than a vent pipe from a trap or soil-pipe.

The Tucker closet, which is also made and sold by various dealers in New England under the name of the "Worcester hopper," from the place where it was first introduced and most extensively used, has an earthenware basin inserted into the mouth of a short conical hopper, which has, just above the trap, an arm cast on it for the attachment of a ventilating pipe. The arm is of good size, 1¼ or 1½ inches in diameter, and where the connecting pipe can be carried to the outer air, or into a constantly heated flue, the ventilation is quite effectual, and the cost small.

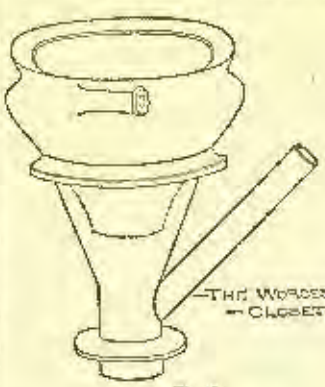


Fig. 2.

The Smith patent closet also has an earthenware basin, inserted into the top of an iron receiver, something like that of a pan-closet, with a flat top. The lower part of the receiver is tapered like an ordinary hopper, and is set in the same way, while out of the flat cover, by the side of the bowl, springs a ventilating pipe, which is to be connected with a flue or carried to the open air. The foul air ascending from the lower hopper clings to the walls, by a well known property of moving gases, and is thus carried up beyond the orifice of the basin, and having gone so far, it cannot, as long as there is a free escape for it in the same direction by the ventilating pipe, move backwards so as to get into the inner basin. The draught of the ventilating pipe tends to draw air down through the inner basin, and forms a further obstacle to the ascent of vapor. This is also a cheap, strong, and, where an outlet for the ventilating pipe can be had, very excellent apparatus, which should be more widely known. The same principle, of discharging the waste through a conical neck into a receiver ventilated by a pipe which opens into it above the discharging mouth, is applied by the patentee to washbowls, urinals, etc.

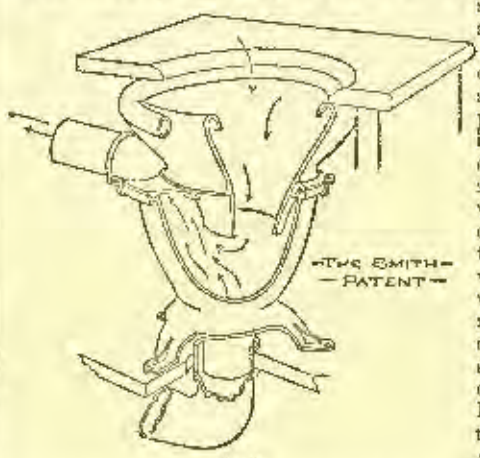


Fig. 3.

Both the Worcester and the Smith closets can be supplied with water in any way desired; either by common or self-closing cocks, or by some automatic apparatus. Still another mode of ventilating a hopper is by Albee's closet ventilator. This consists of a flat pipe of zinc or galvanized iron encircling the top of the bowl, just under the seat, and pierced with holes. At the back a connection is left for a pipe to be carried to a flue or other outlet. This can be easily applied to any old or new closet, hopper, pan, or otherwise, and is very useful in many cases.

Hopper-closets are often supplied with water by means of common stop-cocks, ground or compression, but the ½ inch pipe, which is the size to which the arm of the basin is usually fitted, will waste water

rapidly if the cock should be left open, and self-closing cocks or valves are generally used, especially the variety known as the "hopper cock," which works with a lever, placed under the seat, and lifted by a brass knob somewhat like the pull of a pan-closet. Valves, as Carr's or Bartholomew's, are often employed, placed under the seat, which is hinged, so that when the seat is pressed down while in use the valve is opened and the water flows, and stops when the weight is removed from the seat. Some valves run for a few minutes only when the seat is relieved of the weight, and some, the best of all, run for a short time while the weight is imposed, and again when it is removed. A valve is made by John H. Stevens of Cambridge, Mass., which is operated by the opening of the closet door.

A useful closet for cold situations, such as occur in churches where the temperature of the whole building may be below freezing five or six days in the week, is a hopper with the outlet carried vertically downward by a length of iron pipe to a trap so far below the surface of the ground as to be out of reach of frost, and supplied with water through a pipe and cock also buried four or five feet beneath the surface, the cock worked with a long spindle like a street hydrant. The vertical part of the pipe, from the cock to the arm of the hopper, will not freeze while the water is running, and the cock must have a tube waste, and be surrounded by loose stones, so that when it is shut off the water in the vertical part of the pipe will drain out and soak away among the stones. An excellent cock for this purpose is Lane's Boston Self-closing Valve. The rod can be ordered of any length, and tubes are made for enclosing the valve and rod to keep the earth away. Where the closet is placed in a shed or basement, the trap may be buried in the same manner, and a supply cock of any kind can be put in the kitchen or other warm place. By either of these methods hoppers will work perfectly where any other kind of water-closet would be useless in cold weather.

Instead of being supplied through the ordinary supply-pipe with its cocks or valves, the hopper may be supplied from a cistern placed over it, with a valve like an inverted cup over the mouth of the pipe which leads from the cistern to the arm of the basin. On pulling a wire or chain attached to one end of a lever over the cistern, the other end of the lever lifts the valve, and the water runs into the hopper with a force and suddenness which have a good effect in urging its contents quickly through the trap, instead of leaving them floating in it, as often happens with a feebler flow. Rhoads's porcelain-seated closet is a hopper supplied in this way from a service cistern. No woodwork is used about this apparatus, as the hopper and trap are all of porcelain, with the top turned over so as to make a comfortable seat, and the whole is screwed to the floor, making a very clean and efficient apparatus. A cistern supply of this kind can easily be arranged to work by the opening of the closet door, out of the reach of mischievous hands.

If a still more effectual mode of automatic flushing is desired, a small cistern holding two or three quarts can be fitted up in any convenient place, supplied by a ¼ inch pipe, and discharging by a larger pipe into the arm of the basin. The supply is regulated by a stop-cock on the small pipe, so as to fill the cistern once in five or ten minutes. As soon as filled, it is discharged by a valve with a float or some other self-acting arrangement.

In an automatic cistern just patented by W. G. Rhoads, of Philadelphia (see *American Architect* for July 27, 1878), the outlet pipe forms a siphon in the cistern, and the inlet pipe discharges over a dish so balanced on a pivot that when empty it rests horizontal, but when full it falls forward and empties itself into the cistern. When the cistern is nearly full, the addition of the dish-full of water brings into action the siphon, which empties the contents instantly into the hopper. The regular flushing at short intervals obtained by such an apparatus keeps the closet always clean.

A patented closet of this kind is sold by Alfred Ivers, of New York, which is thoroughly made and works extremely well. With the addition of a ventilating pipe, like that of the Smith closet, it would leave little to be desired for use in nurseries or hospitals.

Any apparatus of this kind, however, consumes a large amount of water; a discharge of three quarts every five minutes amounting to over two hundred gallons a day, and where water is costly, or the supply limited, their use is impracticable. Hopper-closets in general require a good deal of water to keep them clean, and in cities an extra charge is made for their use, even when supplied by self-closing cocks.

The name of valve-closet is by common usage applied to any apparatus, whether employing a pan or other cover for closing the lower orifice of the bowl, to which the water is supplied directly through a valve on the supply-pipe, in distinction from the indirect supply by the intervention of a service cistern; but it is convenient here to restrict it to its technical application to those in which the water is held in the basin by a valve, instead of by a plunger or a pan. This variety is common in England and on the Continent, and one English form, the "Bramah" closet, is occasionally imported into this country. The only native example that the writer is acquainted with is the "American Defiance" closet, made by Wm. S. Carr & Co., of New York, which is much used throughout the United States.

In this apparatus the basin, with its overflow in one piece, and the valve are of porcelain. The basin is bolted down to a small iron hopper, just large enough for the valve to work in, and this is enamelled inside. The fan, under which the water enters, and which serves to spread the stream over the sides of the basin, is also of porcelain, made in one piece with the bowl, instead of being formed out of a bit of sheet lead or copper. An S-trap is set below the hopper. This makes a very clean, nice-looking apparatus, all

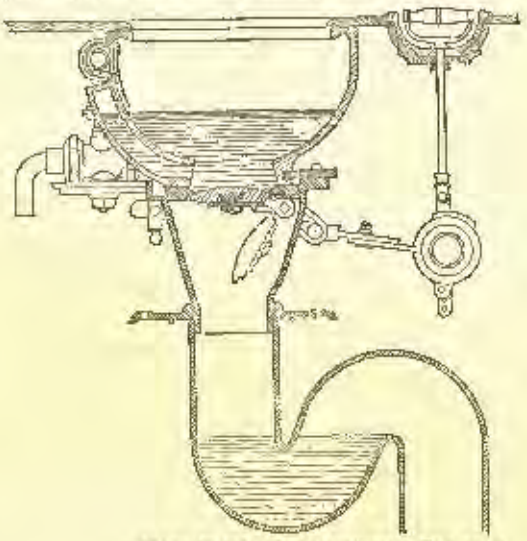
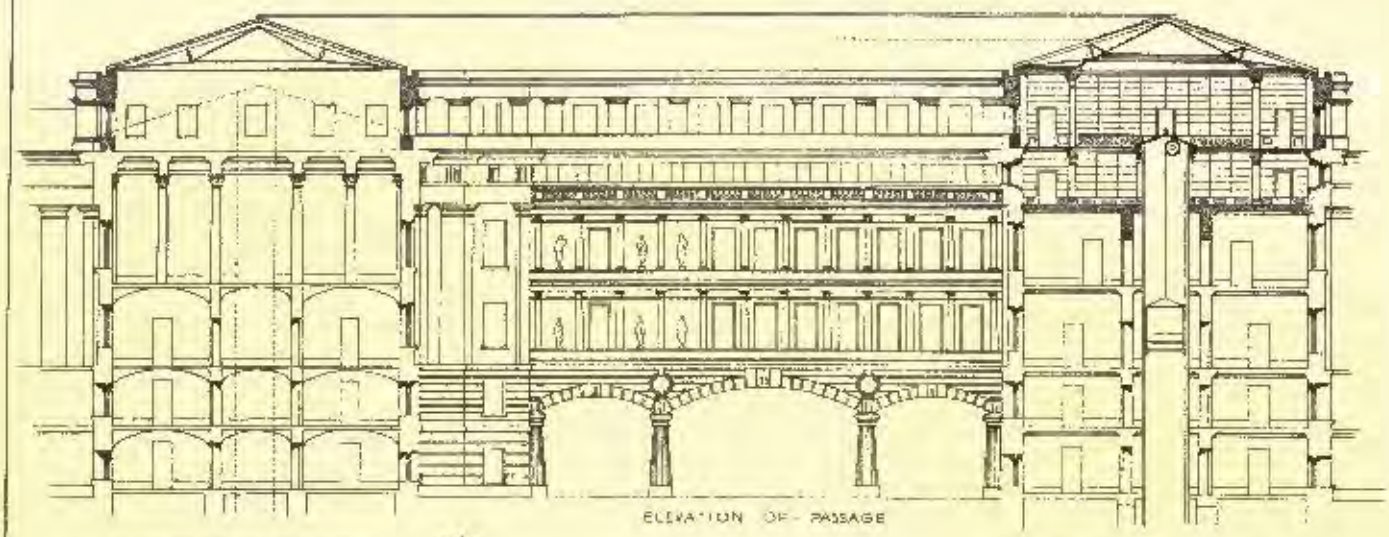


Fig. 4.

the visible parts being white porcelain, with no brown streaks from the metal fans and screws, and no exposure of rusty copper pans at the bottom, and when in good order no closet is pleasanter in use; the bowl holds a large quantity of water, so that there is no danger of its sides being fouled, and the opening of the valve throws the whole contents instantly out of sight. In addition, the space between the valve and the trap, which must necessarily be foul of the emanations from whatever is in the trap, is small, and, being lined with enamel, the filth passes through it without striking, so that the quantity of gas which is generated or retained in it is insignificant in comparison with the blast of vapor which comes from the container of a pan-closet. Its successful operation, however, depends greatly upon the proper working of the valve. There is nothing to keep the water in the bowl except the upward pressure of the valve against the rubber packing of the outlet at the bottom, and if imperfectly made, or unskillfully put in, the valve may not fit tightly or with sufficient pressure, so that the water can run away, and leave the basin dry. Pieces of paper often get in and hold the valve open, with the same result, so that the apparatus should be used carefully, but it well repays good treatment. The trap should be ventilated, to avoid all possibility of siphonage, which is not unlikely, from the large quantity of water discharged, and would admit a stream of sewer gas into the room around the journals of the valve, even though the basin might be full of water.

These closets, like most of those made in New York, are usually supplied directly by a branch from the main water pipe, through a valve worked by the action of the lever which at the same time drops the valve under the basin; but it is better to employ a service cistern, something like that occasionally used to supply hoppers, and dispense with the valve. The ordinary service cistern for pan and valve closets is a wooden box about two feet long and one foot in height and width, holding some fifteen gallons, and lined with lead or tinned copper. To the under side of the cistern is attached a service-box of heavy sheet lead, usually six-pound. The communication from the cistern to the service-box is through a cistern valve, two inches or so in diameter, which is raised by a lever, connected to the pull of the closet by copper wires and cranks precisely like those used in bell hanging. An air tube leads from the service-box to the top of the cistern, and a ¾ inch or ½ inch pipe runs direct to the basin. When the pull is lifted, the valve is depressed and the basin emptied, and at the same time the valve in the cistern is raised and the water runs through the service-box into the basin and out again through the open valve. If the cistern were made without a service-box, as used for hoppers, the flow would cease as soon as the lever was dropped, without the after-flow necessary for filling the basin after the pull is released and the valve closed; but as adapted for pan or valve closets, the raising of the large cistern valve fills the service-box faster than the small pipe to the basin can empty it, and when the cistern valve is dropped by releasing the handle, enough water remains in the service-box to continue the flow until the basin is full. This detached cistern supply can be adapted to any closet, at a cost of a few dollars over the direct valve supply, and is much simpler, stronger, and safer, as well as more perfect in action.

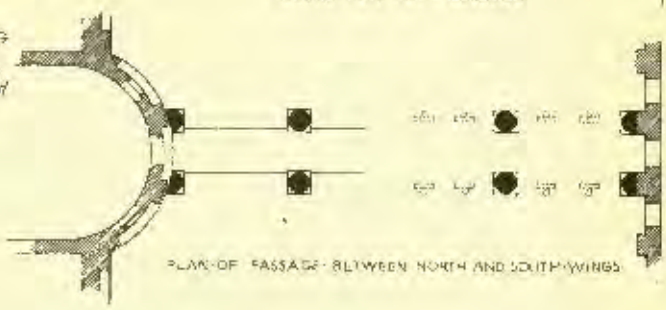
Where a closet is connected directly with the main, it often happens that in case of a failure of water, such as frequently occurs in upper stories, the closet is used, and no water following the raising of the handle, this is left up, so that whenever the water comes again the closet may be flushed. The consequence is that if the water sinks still further in the mains, an almost perfect vacuum is created behind it, and the air rushes in through any open pipe. A



ELEVATION OF PASSAGE

SECTION OF SOUTH WING

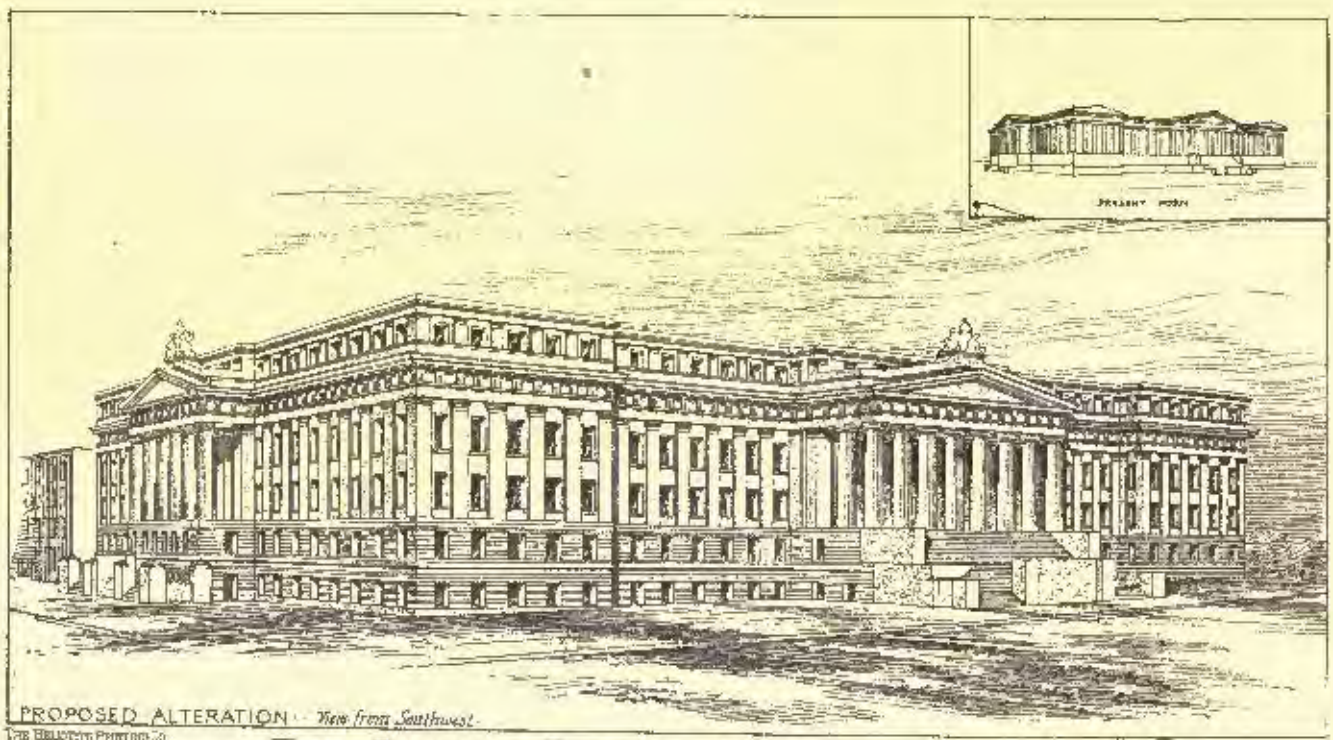
Additional Attic Story proposed over the entire building shown unfinished



PLAN OF PASSAGE BETWEEN NORTH AND SOUTH WINGS

SECTION OF NORTH WING

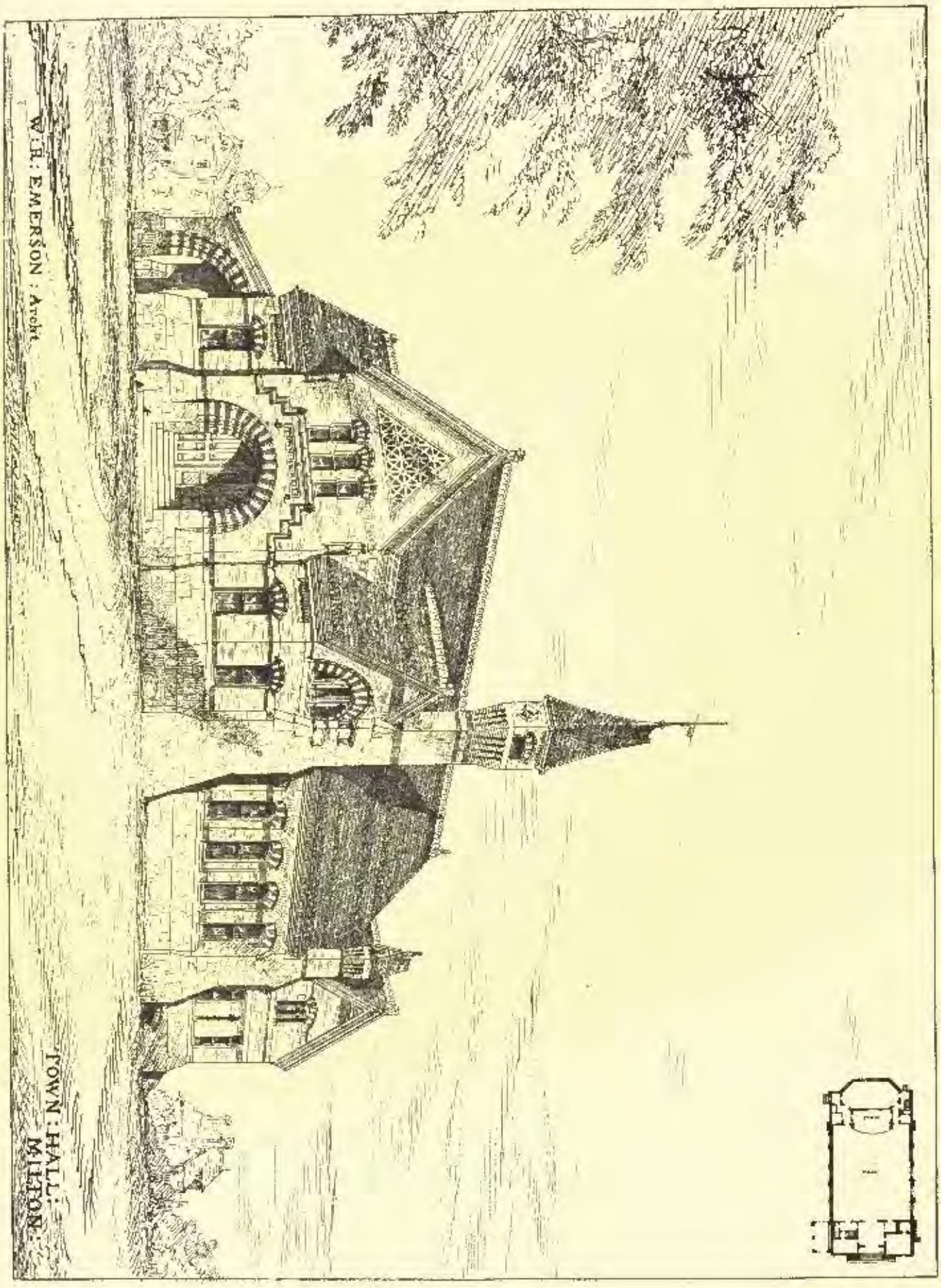
Showing finished Attic Story



PROPOSED ALTERATION — *View from Southwest*

THE HELIOTYPE PRINTING CO.

—THE PATENT OFFICE, WASHINGTON D. C.—


W. R. EMERSON, Archt.
TOWN HALL, MILTON.

American Architect and Building News Aug. 31, 1878. N°140.

PLATE XIII. DISTORTIONS AND CORRECTIONS.

Fig. 58

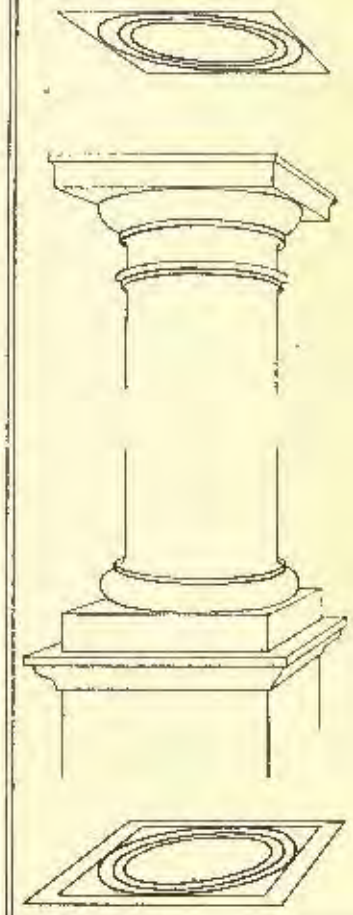


Fig. 65

Fig. 63

Fig. 62

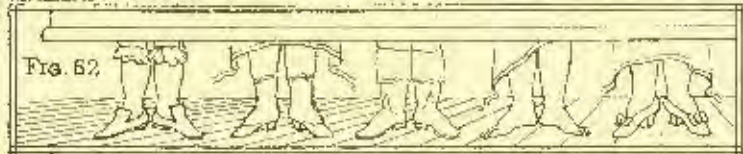
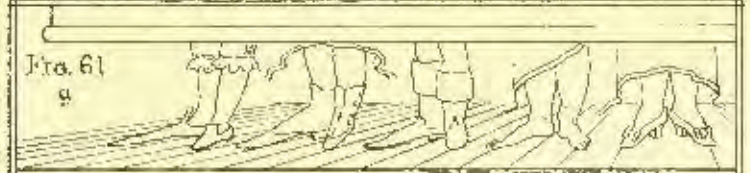


Fig. 61

a



b

Fig. 64 a b

Fig. 60

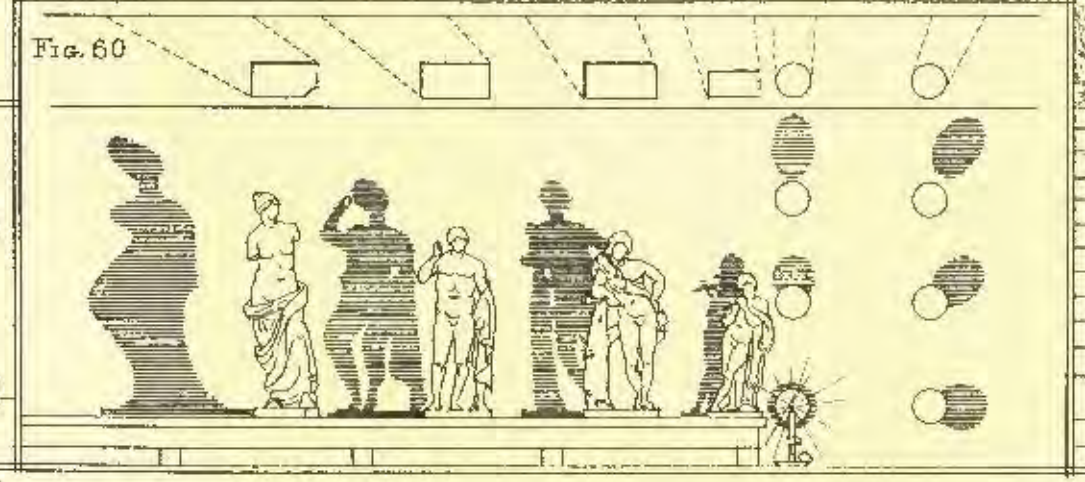
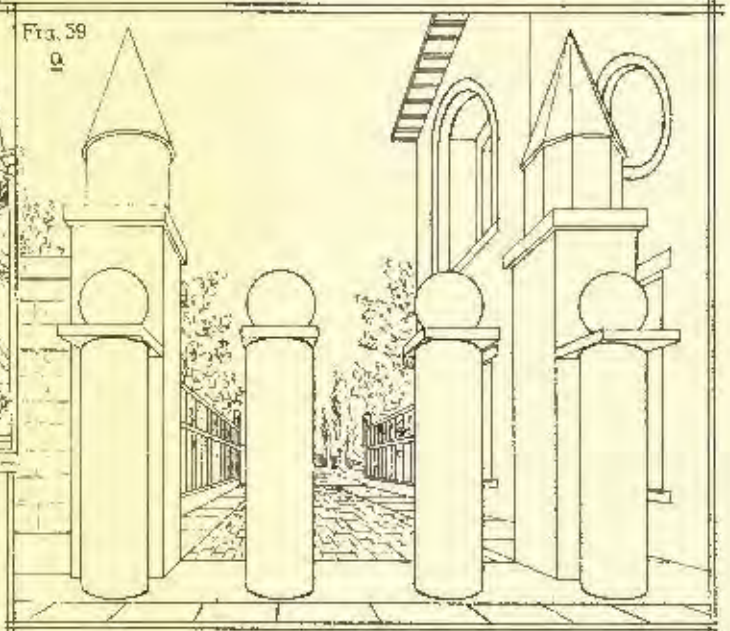


Fig. 59

a



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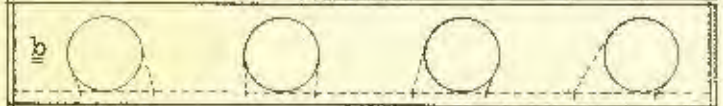

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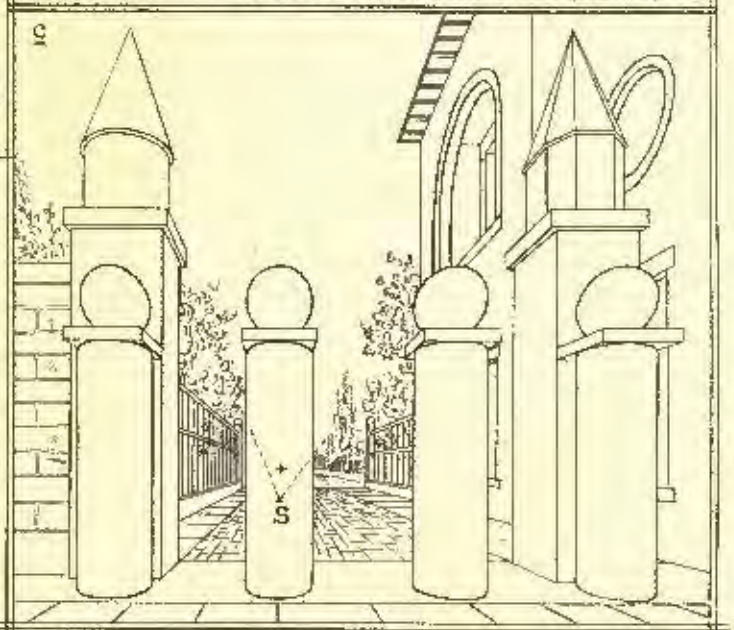
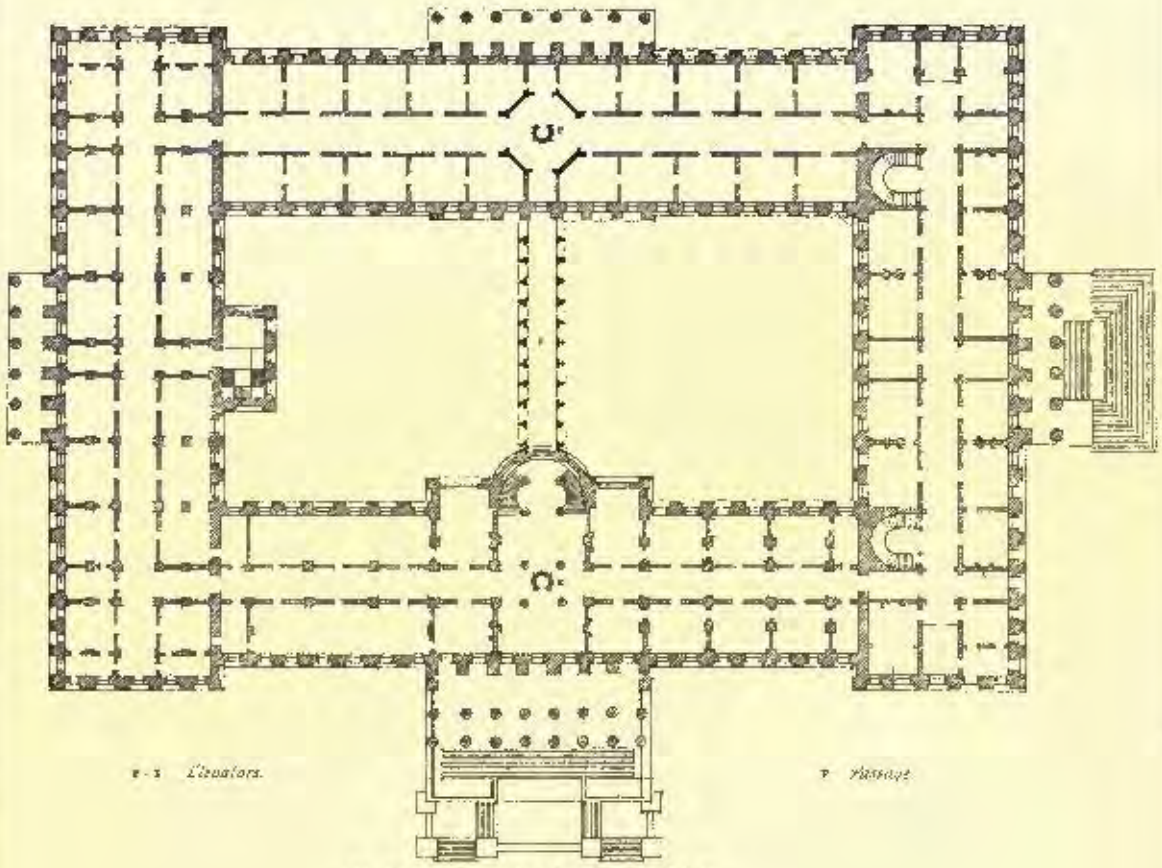
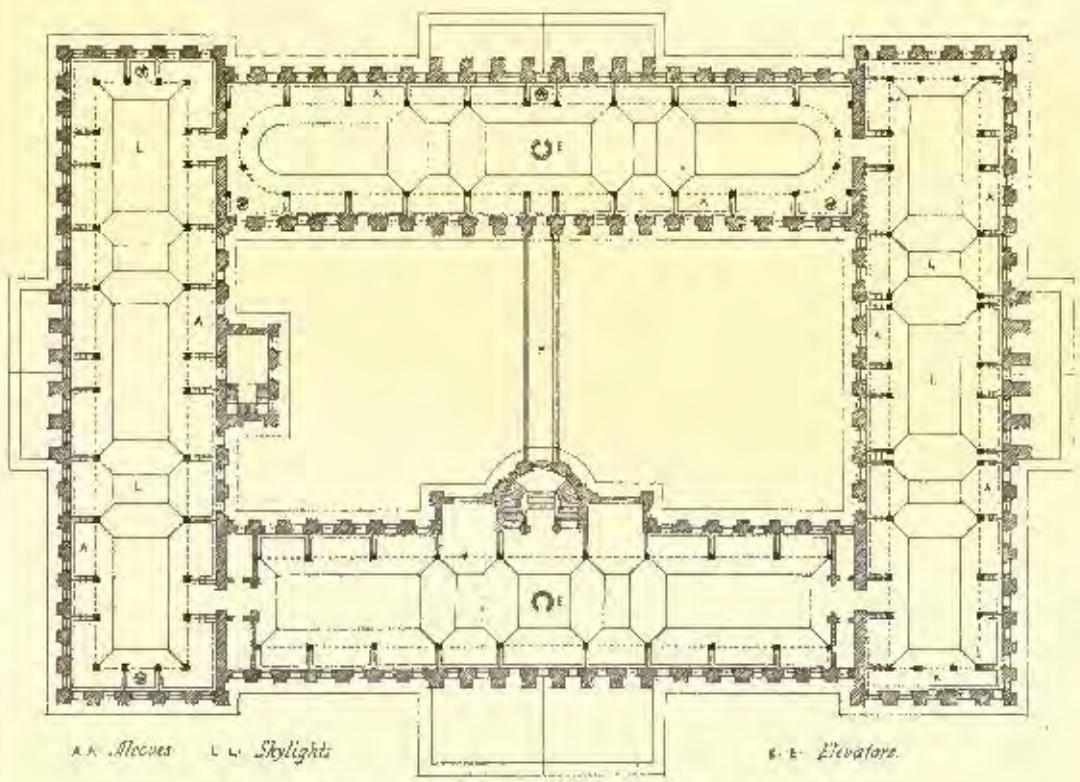


The Heliotype Printing Co. 240 Devonshire St. Boston



PLAN OF SECOND FLOOR



PLAN OF ATTIC AND MODEL ROOM.

— THE PATENT OFFICE WASHINGTON D.C. —

closet valve, thus held open, becomes a conduit through which the vapors of the basin, and sometimes particles of its contents, are sucked with great force into the supply pipes of the house. Fatal disease has been traced to this source of contamination.

Another objection to the direct supply valves is that they soon begin to leak, especially if subjected to a varying pressure. They often come enclosed in a little box, with an outlet to be connected to the waste-pipe, and if not so protected, the whole closet is frequently set in a lead safe, so that the leakage of the valve escapes without doing any mischief, but it may become so serious as to waste considerable quantities of water. If the valve, again, is out of order, the closet is useless until a plumber can be sent for to repair it, while with the cistern supply, the breaking of a wire or crank is easily remedied.

Where the cistern supply is employed, care must be taken to adapt the service-box to the size of the closet basin. With a hopper, no service-box is necessary, as no water is needed to remain in the basin; with pan-closets a small one, holding enough to fill the pan, about a quart and a half, is all that is required, while with the "American Defiance," the English "Bramah," or any of the plunger closets, a service-box holding at least two gallons is necessary. Instead of the ordinary rectangular lead service box, with air pipe to prevent the compression of the air from impeding the entrance of the water, a substitute is often made by extending a two or three inch lead pipe down from the cistern valve about two feet, or more, according to the quantity of water needed, and then contracting it to the ½ or ¾ inch required for the supply to the basin. This needs no air pipe, and the water runs into the basin with more force than from an ordinary service-box of the same capacity.

OFFICIAL REPORT ON THE PATENT OFFICE COMPETITION.

WASHINGTON, D. C., August 9, 1878.

TO THE HONORABLE CARL SCHURZ, *Secretary of the Interior:*

Sir, — The undersigned, a commission appointed to "examine into, and report upon, the plans submitted for restoring and reconstructing the Patent Office Building," have attended to that duty, and would respectfully report: —

We have received the contributions of thirteen (13) competitors, consisting of one hundred and ten (110) sheets, containing upwards of two hundred and fifty-four (254) drawings, with explanations, and twelve (12) written descriptions. Of these, we were obliged at the outset, to reject one, — the contribution of Mr. J. H. Merrill, — for violation of the rules of competition, in failing to make his contribution anonymous.

Upon a careful consideration of your letter of instructions, together with circulars of June 14, and amendments of June 27, 1878, and accompanying lithographic sheets, upon which architects were invited to base their contributions, we resolved that our recommendations must be favorable "to that competitor, who, taking into account the various requirements and suggestions of circular of June 14, shall have presented, in a single scheme, the most intelligent embodiment of these requirements and suggestions;" also, "that, in determining the merits of the various schemes which have been submitted, we, as experts, must, in justice to all competitors, be governed solely by the requirements of said circular, and accompanying plans."

Having now carefully examined the various drawings and written explanations, we are unanimously of the opinion that the author of the contribution designated thus, <, has "presented the most intelligent embodiment of the requirements and suggestions" of the governing circular, and we recommend the erection upon the walls of the present building of an additional story or "attic," substantially as suggested by this competitor. The adoption of this scheme will give an entire new story of offices, seventy-two (72) in number.

In connection with this, we would recommend the central connecting passage, shown upon sheets Nos. thirteen (13) and fifteen (15) of same competitor; or, instead of this, a building, rectangular in form, about seventy-five (75) feet from north to south, and seventy (70) feet from east to west.

This structure should be tangent to the curve of wall of present stairway of south wing, and connect with north wing by a narrow passage only, thus interfering as little as possible with the light of present building. If made with three (3) finished stories, it will contain, say, eighteen (18) offices; thus the proposed treatment of present building, together with the central structure above described, will furnish a total of ninety (90) new rooms, of average size of present offices.

The new model-room, as proposed, will be of uniform height and style over the whole area of the present building; well arranged for light and air, and capable of architectural treatment in harmony with the present structure, both externally and internally.

As a matter of interior arrangement, we would recommend that the principal gallery be made of somewhat greater width than that shown upon section sheet No. fifteen (15), and placed at a lower level, and that a narrower gallery be placed above this.

Much ingenuity has been displayed by competitors in attempts to secure needed space, while erecting nothing which shall be visible above the present sky-line, except at a considerable distance from the building; but every such attempt develops some serious difficulty, such, for instance, as lack of sufficient height in proposed model-room; absence of light and free circulation of air; interference with light and air of present model-room; lack of proper and convenient means of communication between various portions of building; or, fundamental defect in form, which no management of detail, however clever, can obviate, and which in a room of national importance, cannot be accepted or overlooked.

The question of "design for restoration of the building, substantially as it stood before the fire," is hardly more than one of interior detail. Taking this by itself, we are of the opinion that the author of the contribution designated thus (C S in monogram within a circle) has in sheets No. three (3) and four (4) exhibited the best practical answer to this requirement; but that this arrangement would require modification by a widening of the central longitudinal passage, by reduction of projection of cases, and by the opening of others parallel with this, and nearer the side walls. Also, that the roof, as proposed, is open to serious objection on the ground of comfort, and would require to be supplemented by an interior shell or ceiling, separate from the substance of the roof, and enclosing a sufficient amount of air, with proper ventilating arrangement, for protection against extreme temperatures of summer or winter.

The question of "an entire new roof," has been variously answered by various competitors, but in no case has a plan been suggested, so far superior to others, or to those methods of construction, which are the common property of all skilled builders, as to call for special mention.

Iron roofs, protected by "lime of Tiel," "porous terra-cotta," or "other improved fire-proof materials," are recommended. The lime of Tiel, and porous terra-cotta, are both good materials for the purpose, and capable of adaptation to any form of iron work.

In the design of <, sheet No. fifteen (15), which we have recommended, a common form of roof is indicated, spanning the width of the building.

If our suggestions as to the widening of the galleries in this plan be adopted, the columns may be made to stand over the intersection of the corridor and cross walls, as shown in another scheme of this contributor, (sheet No. nine [9]), in which case the piers or columns may become parts of the construction, and thus divide the bearing of the roof into three comparatively small bays, readily spanned by a single beam.

We would suggest as proper locations for three passenger elevators, the well-holes of the two stairways in eastern wing of present building, and one well-hole of the double stairway of western wing, while the opposite well-hole of the latter affords excellent opportunity for a freight elevator, if desired.

The arrangement of the pilasters of the south portico is such, — the outer one, which must govern the projection of an attic, standing considerably forward of the line of the intermediate ones, — that the south wall of the attic must of necessity be supported over the space below, primarily by transverse iron girders, or their equivalent, resting upon the intermediate pilasters and opposite columns.

Before closing our report, we feel it our duty to call attention to the very dangerous condition of the ceiling and roof of the south portico; these are of wood, furred and plastered upon the under side in each case. A wall of masonry separates the enclosed space from the main model-room, but does not pass through the roof. In this wall are openings leading to the main model-room, as well as into the space between the vaulting and roof of same, which openings are entirely unprotected, being closed merely by doors of wood. Fire might readily be communicated to this space, either through the roof, as in the case of the recent conflagration in west wing, or from below, should any evil-minded person, with sufficient ingenuity, be tempted to take advantage of the present condition of the ceiling of the portico. In carrying out the proposed changes in the main building, this ceiling and roof should be replaced by substantial fire-proof construction.

Very respectfully,

JAMES K. WILSON.
RICHARD M. UPJOHN.
H. W. HARTWELL.

DEPARTMENT OF THE INTERIOR.
WASHINGTON, August 9, 1878.

MESSRS. JAMES K. WILSON, R. M. UPJOHN, H. W. HARTWELL, *Present:*

Gentlemen, — I have this day received your report as a Board of experts to pass upon the competitive plans for the restoration and reconstruction of the Patent Office building.

With the submission of this report, your duties in this connection are ended. Delicate as these duties have been, I feel assured that you have faithfully and impartially discharged them, for which please accept the thanks of this Department.

Very sincerely yours,
C. SCHURZ, Secretary.

THE ILLUSTRATIONS.

THE PATENT OFFICE ALTERATIONS, WASHINGTON, D. C.

We here present the designs which show the proposed alterations as submitted to the committee by the successful competitor, Mr. J. A. Vrydagh. The description of the arrangements will be found in the official report of the committee published herewith.

DESIGN FOR THE TOWN HALL AT MILTON, MASS. MR. W. R. EMERSON, ARCHITECT, BOSTON.

This design was submitted in competition some months since.

STUDY IN PERSPECTIVE. PLATE XII.

See the "Paper on Perspective" in this issue.

VENTILATION OF SEWERS AND DRAINS.[1]

In the following remarks I wish to speak but briefly on the theory of sewer ventilation, and more fully on the practical results of the various systems in operation; for we have nowadays quite a legion of fanciful and unworkable ideas which must early die on account of their incompatibility with existing laws, habits, and conditions of the people.

Given a certain condition, namely, a net work of sewers, and we have sewer-gases. Their nature and formulæ are well known; but we are most concerned with their disease-producing power. That they are capable of generating disease which kills thousands, and prostrates tens of thousands annually, is generally admitted, hence the laudable ingenuity and activity in devising means to keep asunder sewer-gases and human beings.

Such devices have been numerous. Among the first were "traps" of various kinds and names, and from our past experience, we can see that they have literally fulfilled their names; not only "traps," but "man-traps;" for thousands, trusting to their protection, have been deceived, and found them a delusion and a snare.

Then we had the introduction of upright pipes or shafts from the main sewers into the streets, and from w.c.'s up to the housetop; and then came the conflict of opinion as to the density and behavior of sewer-gases, whether they would go up these tubes, or whether they would not require some apparatus to draw them up, without which they would be of no use, and this matter was so unsettled, that each person was left to follow out his own notion as to what was best. Last year the great idea in advance may be expressed in one word, namely, "disconnection," and there can be no doubt of the value and importance which that word implies, and of the myriad dangers which its application would prevent; but, as supplementing or rendering unnecessary all the past schemes, we have what may be termed ventilation by exhaustion, and in a few words I will describe its principle and mechanism. The system is known as "Stott's system." It consists in connecting sewers and drains with the furnaces of steam boilers, or other furnaces with a strong draught. For this purpose the ashes place is inclosed by a door, so as to connect the pipe from the sewer or drain in any convenient manner. In all cases, however, it will be observed that the furnace to which a sewer or drain is connected for the purposes of ventilation, the connection must be so arranged that the furnace must only receive its supply of air to support combustion from such sewer or drain. Consequently, it must be continually exhausting the said sewers and drains of foul gases, which must also pass through the fire and be consumed, or rendered harmless.

After making a number of experiments on the spot with the above system, Dr. Angus Smith wrote the following:—

"Some of the admired plans for ventilating sewers are positively dangerous, others are simply valueless. When the sewer air is brought through the fire, as by your method, it is impossible to imagine that it can escape purification to some extent, and one question of prominent importance is, to what extent?

"It is extremely probable that the destruction of all dangerous substances was complete in such cases as I saw. So far as we know, the substances to be destroyed are not very stable bodies, and are readily decomposed. We may say with safety that the method in question, namely, passing the sewer gases through the great fires of factories, will remove the most dangerous properties, and, if the speed of passage be not too great, the purification will be complete. If sulphuretted hydrogen be present it will burn, and the sulphurous acid formed will pass up with the same acid from the coals. If carbonic acid be in excess, it will pass up the chimney with the carbonic acid so constantly formed in the fire. If organic substances, either as germs or more developed living forms be present, they will not endure the heat unless driven through with great rapidity, and if the substances are in a state of putrefaction, that state will be destroyed by a similar heat. The result then is easily known, so far as theory goes; the process if performed well must render the purification complete. So far as practice is concerned, we may be sure that some and even the greater part in many cases of the noxious matters will be thoroughly rendered innocent, whether all or not is a question of size of furnace, amount of air passing, time of passage, and so on.

"The next point to be considered, is to what extent in the sewer is the current of air formed, or we may say, how far will one fire, burning a given amount of fuel, cause a draught in a sewer of a given size. It will require a good deal of experience to answer this question, and that experience can be obtained only by the use of the method in various situations; and I certainly feel justified in recommending that it should be tried and its action carefully examined. The distance to which the draught of air will extend in any sewer depends on the condition of the sewer as well as of the furnace, and I could not pretend to follow the matter into details without abundant experiment. I can say, however, that to cause the currents of air to pass from the interior of our houses into the sewer rather than in a contrary direction, would be to do an incalculable service to a great population, and, indeed, I doubt if there be any one sanitary problem of equal importance before us. It is sufficiently evident that your method solves it to some extent, and I believe it to be equally clear that it is the duty of those, who have the means in their power, to find to what extent the matter is applicable. If the range of action in the sewers be great, the public benefit will be great also. I hope the inquiry will be rigorously made."

The question then is, to what extent will the furnace exhaust the sewer, for it may be admitted that when once the gases and organic bodies are through the fires very little harm can they do.

The first experiment was made at West Vale, near Halifax; the amount of air passing through the fire was measured by the anemometer, and was 980 cubic feet per minute. The question then was, where does this air come from, or how far? The nearest opening was seven yards from the furnace, and the furthest 300 yards away, and between the two points, fifteen other openings or open gullies. Down each of these gullies the anemometer did not register more than about twenty cubic feet, but the fact was abundantly established that, in all of them, remote as well as near, there was a down current. The whole of these gullies were then made up, not absolutely, but in a rough and ready fashion, and the anemometer placed at the extremity of the sewer, when it indicated 490 cubic feet per minute, thus showing that, with well trapped gullies, the effect must extend over a very considerable area.

The next application of the system was to the Halifax Union Poor-house, where some 400 inmates are constantly housed. The guardians in their report say that, since the adoption of Mr. Stott's system in the house, the bad smells, which have taken tons of chloride of lime to disinfect, have been entirely removed; that, although upwards of 150 cases of small-pox and fever have been brought into the infirmaries in a few months, with only four deaths, not one case has occurred among the inmates of any infectious disease; such immunity was never known before the sewers and drains were connected with the boilers.

The Corporation of Halifax then took it up, to see whether such connection with the boilers of mills would remove the complaints of bad smells from certain neighborhoods. The first complaint came from one of the best parts of the town; it was loud and strong, the stench rising into some of the houses at certain times was unbearable; upon investigation, the cause was clearly discovered, namely, the passage into the sewers from several factories where wool was washed of the residual liquor after the soap had been extracted by the addition of sulphuric acid. This liquor, I need not say, was peculiarly offensive. The question then was, shall we stop the business in which this was made, or shall we find a remedy? As our wish was always to interfere as little as possible with business, we decided to connect the sewers with the furnaces of two of the factories; the result has been that we have not had a single complaint since. I ought to add that several of the complaining houses were half a mile from the factories.

Shortly afterwards, in nearly the centre of the town, a similar complaint was made; it was only at certain well-defined times of the day that the stench was so very offensive, and we ascertained that these were the times when the liquid was run into the sewers out of the large cisterns in which it had been stored, so we tried the experiment of running off the liquid at midnight, thinking, of course, to cheat the people, but the effect was that some scores of people had to turn out of bed and out-of-doors too, to escape the noxious effluvia. We then connected the sewer with the boiler of the factory, continuing to use the drains as before, without a single complaint. This extends over a period of four years. A number of similar cases could be added, but the story is the same, namely, complaints which have found their remedy, thorough, effectual and simple, in the connection, on Stott's principle, of the sewers with the furnace of some factory or other furnace having a strong draught.

In 1873, the furnace of Castle Mills, Oldham, was connected with the sewers on Stott's principle, and after giving general satisfaction over a lengthened period, on the recommendation of Dr. Sutton, the Medical Officer of Health, the Corporation decided to have six other connections made in the most complaining parts of the town, and the following were made in 1876:—

	Area of Connecting Pipes.	Number of Revolutions of the Anemometer.	Cubic Feet of Air passing per Minute.
	In. In.		
Albion Mills	22 × 7½	6½	750
Horsedge Mills	33 × 7	18	1,530
Britannia Mills	21 × 6	10½	920
Providence Mills	22 × 8	6½	800
Hope Mills	20 × 8	10	1,080
Castle Mills	16 × 16	4½	700
			5,780

Thus we have for the six mills 5,780 cubic feet of air drawn through the sewers per minute; or for a day of ten and one half hours, 3,641,400 cubic feet. When these had been in operation twelve months, Dr. Sutton gave a report to his committee, in which he says:—

"All are working well except one, the fireman stating that when the apparatus is closed, there is not sufficient draught for the fire, consequently the doors have to be opened. If it had been connected with Gravelwalks drain, as I recommended, instead of the cross street drain, it would have worked well, the drain in Gravelwalks being much larger. Several of the householders in the neighborhood complain that the offensive smells from

[1] A paper by D. Aloley, M. R. C. S., L. R. C. P., etc., Officer of Health, read before the Society of Arts, and published in the Journal of the Society.

the street grids are as bad now as they were twelve months ago. (Query, Because the apparatus is not working?) The inhabitants who resided some time previous to the adoption of this system in the other parts, informed Inspector Walton and myself that the offensive smells were considerably lessened, a result which they principally attributed to Stott's patent; but as Mr. Rawlinson, the Consulting Engineer to the Local Government Board, who visited Oldham previous to my appointment, urged upon the Council the importance of removing the grid traps throughout the town for the purpose of promoting free ventilation, which was carried out, a great portion of the efficacy of Stott's system is counteracted; but even under these circumstances a considerable amount of foul air is conducted from the tributary drains to the furnaces, where the sulphuretted hydrogen, ammonia, and organic compounds pass through the fire, and are rendered innocuous."

In the first week of this month (May) Dr. Sutton made a further inspection of the district partially under Stott's system, and the following is his report: —

HEALTH DEPARTMENT,
TOWN HALL, OLDHAM, May 3, 1878.

Upon inspection, during this week, I find in every case where the same tenants now reside who did so in September, 1877, that they one and all highly appreciate the great improvements of the atmosphere of their houses. Frequently complaints were formerly made to me of their rejecting their food, caused by the fœtid steam being blown into the streets through the grids, and into their houses through the slopstone pipes; and the mortality by simple continued fever and convulsions is materially reduced. I entertain the same opinion which I have always held that, in closely-confined and densely-populated districts, nothing surpasses this method of dealing with sewer-gas. J. M. SUTTON, M. D.

Two years ago the managers of Smedley's establishment, at Matlock, not satisfied with the sanitary condition of the place, applied to Mr. Stott with regard to his invention, with the view of rendering the place as healthy as it was possible to make it. Mr. Stott examined the drainage, and suggested that the whole of the drains should be connected together, and then attached to the boiler on his principle. This was done in a most satisfactory manner, and the result has been all that could be desired.

In conclusion, it will not be out of place to state that this principle is well adapted for the ventilation of steamships, by making the heat of the funnel the exhauster of the foul air below: nothing can possibly be simpler, more effectual, or more economical.

And just as I finish this paper comes the sad news of the explosion on board the mail steamer Sardinia, the facts of which are all well known to you; suffice it to say that, if this principle had been carried out on that steamer, such a catastrophe would have been an absolute impossibility.

CORRESPONDENCE.

A COMBINATION PLAN. — WORK AT THE CATHEDRAL. — THE SAFETY OF SOME PUBLIC BUILDINGS.

New York.

A SPIRIT of exclusiveness and a desire for privacy have prevented in great measure the carrying out of anything like combination in the designs of private dwellings. We have rows upon rows of brown stone fronts, each house having no closer connection with its neighbors than the party-wall between them. Now and then in the rows of cheap cottages some attempt is made to unify the several buildings, perhaps by carrying the central one up a story higher, or by setting the fronts on different planes, but in general the only architectural device for housing several families in what is really one building is manifested in the apartment house. At the corner of Thirty-third Street and Madison Avenue Mr. R. M. Hunt is to put up a combined dwelling, a real combination too in plan as well as in outward design. At this place Mr. Edgerton L. Winthrop and Mr. Frederic Bronson are the owners of a plot measuring 49×76 feet, the shorter length on the avenue side. Instead of cutting this into a pair of equal parallelograms, a give-and-take policy has been followed. Mr. Bronson enters from the avenue at one corner, while Mr. Winthrop enters from the street by a central porticoed doorway. The two houses are in no wise flats, since there is a distinct party-wall rising between them, though this wall is not built in one plane. The dividing line has been built parallel with the Thirty-third Street front, and by giving a little here and a little there where he can well spare it, each house-owner gets in return available space which in houses of the ordinary type would be wholly wasted. The Bronson or avenue entrance leads by the hall to the stairway in the centre of the house, past a large reception room, while the dining-room is at the rear, overlooking the area. The service stairs run up beside the dining-room. The Winthrop house has its reception room on the outer angle of the building, curtailed somewhat by the carrying over of the party-wall to allow space for the Bronson hall. Directly before the entrance is the main stairway, starting at right angles, and leading up by easy runs; back of this, in the space gained by setting back the party-wall, is the servants' stairway; to the left is the dining-room and here the party-wall is on the axis of the plot. The houses are of the English basement pattern, and upon the first floor great fire-proof folding-doors permit a general opening on gala nights. Above the hall of the Winthrop house and extending out in a broad bay over the projecting vestibule is a "boudoir", or morning room, with a fire-place against the blank end of the bay. The chimney arrangement here is peculiar. In the basement is a range fire-place immediately below the main door-step. The flue runs up in the brick sides of the porch. The porch and bay fall back into the main wall on the line of the first chamber floor, and from that point to the roof the chimney-stack is carried on the deep iron box-girder and relieving-arch of brick, while between two of the windows on the mansard roof the chimney top appears, rising apparently out of the main entrance. The construction is good, and security is amply looked after, but the feeling is that guests and visitors enter the house in a sort of horizontal Santa Claus fashion, through the chimney. The exterior is in Philadelphia brick, with Belleville, N. J., stone for window and door finish. No distinction is made on the outside between the two buildings, nor is their interior division line indicated in any way. The finish within is mainly in oak; and at a total cost of over $60,000 the dual building will be a noteworthy one.

At the Roman Catholic Cathedral on Fifth Avenue, it has been decided to build a crypt below the main altar, and workmen are now drilling the opening in the rock bottom upon which the whole church stands. As the stained glass windows are in the nave-aisle and clere-story windows, blasts cannot be used in the building, and the rock is lifted all slowly and laboriously by plugs and wedges. The apse windows have not yet been inserted, nor will they be until the high altar is in position, when they will be designed with special reference to their effect upon the whole. The altar itself has arrived from Italy, ready for erection, and will be put up as soon as the vault and foundation are completed. The crypt will contain twenty-one spaces for bodies, and will be reserved for archbishops and high church dignitaries. The body of Archbishop Hughes, who over twenty years ago originated the project of building the cathedral, will be removed there upon the dedication of the building. Workmen are now busily engaged laying the floor. The ground was cleared down to the rock face, and brick bearing walls at distances of twelve feet were carried up and down the nave and aisles; upon these the wooden beams rest, and the floor will also be of wood. Advantage has been taken of the space below to hang the steam pipes, water and gas pipes, and these may be reached at any time by crawling below the floor. It was at one time intended to have a tile floor, but Cardinal McCloskey feels that such a plan would entail suffering upon the kneeling worshippers, and insists upon the use of wood, except in the lobbies and entrances. The scaffolding has now been entirely removed from the building.

Attention has been called to the several government buildings here by alarmist reports that the Custom House and the Assay Office were in dangerous condition. The Custom House, once the Merchants' Exchange, was built by Rogers, architect, in 1845, and stands to-day without an appreciable crack or sign of settlement. The heavy granite columns and walls were well set, and the building is no whit inferior as a piece of workmanship to anything of a later date. Around its interior courts run galleries of stone supported on granite brackets or corbels, and it is the alleged insecurity of this stone-work that has given rise to the alarming reports. One angle corbel cracked and fell several years ago, owing to some unforeseen imperfection in the stone, and upon this General Steinmetz pointed out the advisability of taking down all the galleries and substituting iron balconies. At the Assay Office it is asserted that the acid fumes and the leakage have excited rust and corrosion in the iron-work, and wooden supports have been inserted as much to bear any additional weight as to supplement the weakened iron columns. In the Treasury Building proper, a great iron safe is building, 47×28 feet in plan and twelve feet high, for the storing away of the rapidly accumulating silver coin. The safe is now standing at the works of George Damon, Bloom. In a few days it will be taken apart and shipped to this city, where it will completely fill the vault arranged for it.

W.

BARTHOLDI'S STATUE OF LIBERTY.

[Paris correspondence of the New York *World*.]

THE statue of Liberty has been before the world as a proposition, if not in bodily shape, at any time since the great Centennial; and its literatures of purposes, principles of construction, and measurements is now quite a library in itself. I have no difficulty, therefore, in finding out that the figure in sheer height, clear of all reckoning for its coronet, and for what may be called its footstool, will measure 32 metres, or 104 feet 11⅓ inches. I learn further that the pedestal of granite on which the lady is to stand is, with all due respect for my cicerone, 25 metres high, instead of the 27 named, the 25 metres being equal to 82 feet. Lastly, that if you take the figure from the sole of her classic foot to the extreme end of the torch in her upstretched hand, you will have a height of 42 metres, and if you add this to the 25 already given as the height of the pedestal, you will have a grand total of 67 metres from the surface of the ground at Bedloe to the extreme end of the torch. Now, 67 metres make exactly 219 feet 11⅓ inches. Can anything more forcibly illustrate the niggardly closeness of the French in a reckoning than their neglect to make it 220 feet?

Let me add but this in the question of size: The statue, as a statue, and quite apart from its pedestal, is to be the biggest thing of its kind; the Colossus of Rhodes would be a mere toy to it, and so would the great Sphinx.

But all this refers only to the work as it will be; now let us consider it as it is. It is being made in pieces, as space and funds permit, and for the first piece made, the fore-arm holding the torch, New Yorkers may see it any day by going to Madison Square. The second part, the head and neck and the beginning of the spacious

breasts (which would be large enough for their function if Liberty were the mother of all the virtues), is now finished and on view on the Exhibition grounds, whence it will be dispatched straight to its ultimate destination. The rest—the trunk, the capacious draperies to cover the lower limbs, and the arm holding the tablet of independence—is all yet to be, and the world will have reason to congratulate itself if it get fully "enlightened" by means of this completed torch-bearer by the year 1881.

Long before the head reached the Champ de Mars my curiosity as to this stupendous specimen of womanhood took me to the workshop in the Rue Chazelle, near the Parc Monceau, where it is being made. The workshop was built wholly and solely for the accommodation of this one inmate and her attendants, some fifty workmen hammering for their lives on sheet copper to complete the toilet of her tresses for the show. The Lilliputians reached her back hair by means of ladders running from stage to stage of a high scaffolding. I mounted the scaffolding with them and stood on the level of her awful eye—some thirty inches from corner to corner—to be ingulfed in her gaze. One of them, a taller manikin than the rest, by something more than the thickness of her thumb nail, from a platform just level with the line of the lips, was tinkering at a line that marks the middle of her brow, and his six feet of height exactly covered the space between the two, and no more. The whole scene abounded in these curiosities of measurement. A number of pigmies of our species crawling about the inside of what appeared to be a vast caldron used in the sugar-refining trade were understood to be really at work on the crown of her head. A smaller caldron, on which two little fellows were busy in a corner, was the tip of her classic nose. Her lips, from dimple to dimple, were as long as my walking-stick, and fifteen people, I was told, might sit around the flame of her torch. . . . . My final care is to see some men of note on art who may consent to give me their judgment on the statue, and first I turn to Auguste Bartholdi, the designer. I find him at his studio in a small street of which the name has really escaped my recollection, though I know well enough which way to turn for it when once I am in the neighborhood of the Gare Montparnasse. Bartholdi is an Alsacian as well as a Frenchman, still young for an artist of his reputation—I should not give him a day more than forty—sincere and winningly bold in manner, of middle height, dark, large-featured, and with a very penetrating glance. He gives you the impression of a man of power, and his works confirm it. He loves to model on a colossal scale—perhaps because this most readily conduces to the simplicity and massiveness of effect which he seeks in art. He is a sculptor of the old, and, as most of us still think, the best school; and the modern Italians, I know, and Carpeaux, I believe, are his bane. He is the sculptor of the Lion of Belfort, which is to be put up in front of the rock-built fortress so heroically defended in the last war, and by that defense preserved to France. This beast is to dwarf all others of his species, including those of Trafalgar Square. In fact, I think he might find room for all four of the latter at a meal in his single person, for the considerably reduced model of him exhibited in the Salon this year is bigger than any one. He measures in his full proportions ninety-one feet ten inches in length, forty-nine feet three inches in height, and he is a superb example of the skill and knowledge which the French have developed of late years in the artistic treatment of his race—a fine vindication of truth and nature against convention, as represented by that monster in every sense, the blubbering Lion of Lucerne. But I must not forget the artist in the work, nor omit to say of the former that he was a very distinguished member of the French jury at the Exhibition of Philadelphia, and that his report on the decorative arts of the United States is one of the best things of the kind.

In my visit to him I found him naturally unwilling to say much about the statue of Liberty. He could only be induced to discuss it by a reference to the general principles on which he had worked. "I have a horror," he said, "of all trippery of detail in sculpture. The forms and effects in that art should be broad, massive, and simple. In my Lion of Belfort, since you press me for an example, I have given only the grand outlines. I have not wasted my time in grooming the mane. I have sought only such a distribution of masses of light and shade as may be likely to tell at the distance from which the thing is to be viewed. I own that the work of what we are pleased to call our modern school pains me by the absence of all endeavor of the kind. The Italians, for instance, as we see them in this exhibition, are positively mean in their imitations of texture in marble work. The pattern of a lady's fan, the lace in her dress, her slippers, and the embroidery of her cambric, are done to the life, and nothing else. All that is but so much taken away from the effect of the essential parts—the form and face. You can hardly conceive how much a figure may lose by such treatment until you see it in some striking example. There is one in New York, a monument in Madison Square, of a great man seated in his chair. The chair is so elaborately wrought that it takes all attention away from the great man. The upholstery is the first thing you look at and the last. Contrast that with another seated figure, the Voltaire of the Théâtre Français, in which I will defy you to ignore, for one moment, the head, the noblest part of the work, the cause and motive of all the rest. Of the statue of Liberty itself I can only say that I have modelled it on these principles, always bearing in mind the place it is to occupy, and consequently not breaking up the work into frivolous detail."

Mr. Story said: "The Greeks built up their colossal statues most solidly in stone or wood, and on this laid the plates of gold, ivory, or other material that gave the finish to the outward form. I think they were just as right in the mechanical part of the business as we know they were in the artistic. They could dare to do big statues, because they had thought out every question belonging to such work. I am not sure that we have done so; we have too much else to think of nowadays. There are many things to bear in mind before you can rear a statue of a hundred feet with credit to yourself or pleasure to the beholder. The first is that, when you are close to such a statue you cannot see the whole for the bigness of the parts, and that when you are at a distance you lose the parts—the features, the dress, and all the comparative nicetics of the modelling. Look at that immense statue on the top of the Capitol at Washington. Try to see all of it, and I will defy you to see more than a great splurge. All detail, even necessary detail, is lost; it is a mere silhouette, a great blot of black metal against the sky. Now the Greeks knew of that difficulty—knew that a colossal statue seen at a distance had a tendency to become a mere outline—and so they took care to make their outline, in so far as possible, tell the whole story. It was pure, varied, and highly illustrative, beautiful in itself, and in some measure independent of the rest of the work. Their figures were in general so modelled as to present a good outline from every point of view. You could not surprise the composition into ugliness by mere cunning in the selection of a stand-point. Will all these conditions be fulfilled in the present statue? I do not even hint that they will not, for it will be impossible to judge of the effect of the colossus without seeing the colossus itself, and, as yet, no man has seen that—not even Bartholdi, who is making it only bit by bit. Mere statuettes, photographs, and other reduced copies, give absolutely no help; we must have the full-sized original in its place. We may all of us then, at our leisure, apply to it the recognized law of art which evidently governed the practice of the first nation of sculptors in the world."

TRANSLATION OF THE INSCRIPTIONS ON CLEOPATRA'S NEEDLE.

Dr. Birch, of the British Museum, has just favored Mr. Dixon with the following revised translation of the hieroglyphical inscriptions on the obelisk:—

"*First Side — Central Line toward East when Erected on Embankment.* — The Horus, lord of the Upper and Lower country, the powerful bull, crowned in Uas or Thebes, the King of the North and South, Ramen Cheper has made his monument to his father, Harmachis, (Horus in the Horizon,) he has set up to him two great obelisks, capped with gold, at the first time of the festivals of thirty years, according to his wish he did it, the son of the Sun Thothmes, (III.,) type of types did it beloved of Harumachu (Horus in the Horizons) ever living.

"*First Side — Left Line.* — The Horus of the Upper and Lower country, the powerful bull, beloved of the Sun, the King of Upper and Lower Egypt, Ra-nsurma, approved of the Sun, lord of the festivals, like Ptah-Tanen, son of the Sun, Rameses beloved of Amen, a strong bull, like the son of Nu, (Osiris,) whom none can withstand, the lord of the two countries, Ra-user-ma, approved of the Sun, son of the Sun, Ramessu, (II.,) beloved of Amen, giver of life, like the Sun.

"*First Side — Right Line.* — The Horus of the Upper and Lower country, the powerful bull, son of Tum, King of the South and North, lord of diadems, guardian of Egypt, chastiser of foreign countries, son of the Sun Ramessu, (II.,) beloved of Amun, dragging the South to the Mediterranean Sea, the North to the Poles of Heaven, lord of the two countries, Ra-user-ma, approved of the Sun, son of the Sun Ramessu, (II.,) giver of life, like the Sun.

"*Second Side — Central Line, toward River (South) as Erected on Embankment.* — The Horus of the Upper and Lower country. The powerful bull, crowned by Truth. The King of the North and South, Ramen Cheper. The lord of the gods has multiplied to him festivals on the great Persea tree in the midst of the place of the Phœnix (Heliopolis.) He is recognized as his son, a divine child, his limbs come forth daily as he wishes, the son of the Sun Thothmes (III.,) ruler of An, (Heliopolis,) beloved of Harumacha (Horus in the Horizon.)

"*Second Side — Left Line.* — The Horus of the Upper and Lower country, the powerful bull, beloved of Truth, King of the North and South, Ra-user-ma, approved of the Sun, born of the gods, holding the two lands, (of Egypt,) as the son of the Sun, Ramessu, (II.,) beloved of Amen, making his frontier wherever he wished, who is at rest through his power, the lord of the two countries, Ra-user-ma, approved of the Sun, son of the Sun, Ramessu, beloved of Amen, the lustre of the Sun.

"*Second Side — Right Line.* — The Horus of the Upper and Lower country, the powerful bull, son of the god Chepera, the King of the North and South, Ra-user-ma, approved of the Sun. The golden trait, rich in years, the most powerful, the eyes of mankind behold what he has done, nothing has been said in opposition to the lord of the two countries. Ra-user-ma approved of the Sun, the son of the Sun, Ramessu, (II.,) beloved of Amen, giver of life, like the Sun.

"*Third Side — Central Line, West Side, as Erected on Embankment.* — The Horus lord of the Upper and Lower country, the pow-

erful bull, beloved of Truth, the King of the South and North, Ra-nam Cheper. His father Tum has set up to him his great name, placing it in the temple belonging to An. (Heliopolis.) giving him the throne of Seb, the dignity of Cheper, the son of the Sun, Thothmes, (III.) good and true, beloved of the Spirits of An, (Heliopolis.) ever living.

"*Third Side — Right Line.* — The Horus of the Upper and Lower country, the powerful bull, well-beloved of Ra, the King of the South and North, Ra-user-ma, approved of the Sun, lord of festivals of thirty years, like his father Ptah, son of the Sun, Rameesu, (II.,) beloved of men, son of Tum, beloved of his loins; Athor, the goddess, directing the two countries, has given him birth, the lord of the two countries, Ra-user-ma, approved of the Sun, the son of the Sun, Rameesu, (II.,) beloved of men, giver of life, like the Sun.

"*Third Side — Left Line.* — The Horus lord of the two countries, the powerful bull, son of Shu, the King of the South and North, Ra-user-ma, approved of Ra, the lord of diadems, director of Egypt, chastiser of foreign lands, son of the Sun, Rameesu, (II.,) beloved of Amen, bringing his offering daily in the house of his father Tum; not has been done as he did in the house of his father, the lord of the two countries, Ra-user-ma, approved of the Sun, the son of the Sun, Rameesu, (II.,) beloved of Amen, giver of life, like the Sun.

"*Fourth Side and Central Line Toward Road (North) as Erected on Embankment.* — The Horus of the Upper and Lower country, beloved of the god of the tall upper crown, the King of the South and North, Ramen Cheper, making offerings, beloved of the gods, supplying the altar of the spirits of An, (Heliopolis), welcoming their persons at the two times of the year, that he might repose through them with a sound life of hundreds of thousands of years with very numerous festivals of thirty years, the son of the Sun, Thothmes, (III.) the divine ruler, beloved of Haremachu (Horus in the Horizons) ever living.

"*Fourth Side — Right Line.* — The Horus lord of the Upper and Lower country, the powerful bull, beloved of Ra, the King of the South and North, Ra-user-ma, approved of the Sun, the Sun born of the Gods, holding the countries, the son of the Sun Rameesu, (II.,) beloved of Amen, the strong hand, powerful victor, bull of rulers King of Kings, lord of the two countries, Ra-user-ma, approved of the Sun, son of the Sun, Rameesu, (II.,) beloved of Amen, beloved of Tum, lord of An, (Heliopolis,) giver of life.

"*Fourth Side — Left Line.* — The Horus, the powerful bull, son of Ptah-Tanen, lord of the Upper and Lower country, the King of the South and North, Ra-user-ma, approved of the Sun, the hawk of gold, rich in years, the greatest of victors, the son of the Sun, Rameesu, (II.,) beloved of Amen, leading captive the Rutenun (Syrians) and Peti (Libyans) out of their countries to the seat of the house of his father, lord of the two countries, Ra-user-ma, approved of the Sun, son of the Sun, Rameesu, (II.,) beloved of Amen, beloved of Shu, the great god, like the Sun.

"The scenes on the pyramidion represent the monarch Thothmes III., under the form of a sphynx, with hands offering to the Gods Ra and Atum, the two principal deities of Heliopolis. The offerings are water, wine, milk, and incense. The inscriptions are the names and titles of the deities, the titles of Thothmes III., and the announcement of each of his special gifts." — *London Times.*

QUESTIONS IN SEWER VENTILATION.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir, — Having lately to re-arrange the drainage of my house, and having become much impressed by the necessity of properly ventilating all drains, I adopted what seemed to be a thorough and rational system. As there were no set-basins or bath-tub wastes to complicate matters, but only one water-closet and the kitchen sink to provide for, the problem was of the simplest. The soil-pipe, untrapped at any point below the water-closet trap, was carried above the roof and covered by a suitable ventilating cowl. That all the gasses generated in the tight cesspool into which all the sewage is carried might not pass through this soil-pipe, and by escaping through unsuspected leaks cause the very evil I was seeking to avoid, I took great care that the cesspool should be well ventilated. This was done by a line of five-inch drain-pipe carried above the roof. Satisfied that the pressure of gas could never be great enough to force the few traps, and that a perfect circulation of air through this small system of pipes was established, I called my work good and thought no more about it.

Time showed that the system was working as it was intended to work: the draught was perfect, the circulation uninterrupted, and the smells probably rejoiced exceedingly at the ease with which they escaped into the upper air from their polluted source below. But as the cesspool filled and matter accumulated in it I became aware, on nights when the air was perfectly dead and quiet, of a sickening and noisome odor, seemingly pervading all the atmosphere, but which when traced to its source was strongest at the base of the five-inch ventilating shaft. I have remedied that evil for the moment by stopping up the opening from the cesspool into the shaft, the result of which is to force the soil-pipe to fulfil, unaided, the dangerous task of ventilating the cesspool. Now what have I done that is wrong, and what shall I do to remedy the evil?

Some of the experts from whom I hope to hear through the columns of your journal will say, undoubtedly, that the trouble is caused by the fact that the top of the ventilating shaft, though rising two or three feet above the roof, is only a few feet from the eaves, and is consequently some twelve feet lower than the ridge-pole. Perhaps it would be better to raise the vent above the highest part of the roof, but the fact that the odor is strongest at the very base of the shaft seems to show that the escaping gas is heavier than the air, and that after being forced to the top by the formation of new gases in the cesspool below, it simply trickles over the edge and flows down the outside. To raise the outlet above the ridge would then only increase the evil by distributing the heavy gas so that, under certain conditions of the atmosphere, it could flow down both slopes of the roof.

If such is the action of sewer-gas under certain circumstances, is not the carrying of the open soil-pipe above the roof about as insanitary a scheme for ventilating public sewers as can well be conceived?

It is very noticeable that the odors arising from a cesspool in which a thick, greasy scum has formed, are less obnoxious, though possibly more unhealthy, than those which rise from a half-filled vault in which no such scum has had time to form.

In some countries it is customary for persons who have been drinking liquor to swallow a small quantity of olive oil, which floating to the top of the contents of the stomach prevents the exhalation of the unpleasant gases arising from mixed and fermenting liquors. Is it probable that the application of a quantity of oil — particularly if made strongly aromatic — to the contents of a cesspool would have a similar result?

Is it possible that too much air is introduced, and that instead of merely providing for the escape of the gases which must form inevitably, I am in reality manufacturing gases most unnecessarily?

I would ask, too, as to the results to be expected from filling with a layer of powdered charcoal, say to half its capacity, that portion of the shaft which, being below ground, is horizontal; but I fear I have asked too much already.

Respectfully, yours, V.

THE STUDIES OF AN ARCHITECT.

[We venture to print, without special permission, the following extract from a letter which we have received from an architect, because we think our readers will see in it, as we do, a very interesting record; and because the manly energy which it displays, and the resolute endeavor of the writer to make thorough work of his training, should be a valuable example to other students, who may find the way of professional schooling a steep one, and may be strongly tempted to content themselves with the least preparation that they think will do instead of working patiently for the greatest they can get. It might also serve to emphasize to the students of this day the advantage they have over their predecessors, in the professional schools that have lately been opened to them, which set the means of professional instruction before them in the most direct and advantageous way, and save them the hard necessity of working without clear direction, and battling alone through all their course. — EDS. AMERICAN ARCHITECT.]

"You have been having ideas on the proper qualifications of architects. I will tell you of my education and how it was obtained. I went to work at nine years of age to tend the pitch-pot in a ship-yard, where my father was foreman. I worked three months at that and turning the grind-stone. Then I was taken into the mould-loft and helped to lay down vessels. After being in the yard probably four or five years I had thoroughly mastered the intricacies of ship-building theoretically, and pretty well practically. I studied nights and odd hours, until I could read Latin and Greek quite well. I could read Cæsar and the Anabasis, and translate, as my friend a reverend D. D. said, quite well for a self-educated boy. Then I attended Grammar-school No. 22, in New York, and graduated prepared to enter the Free College of the City of New York; but I did not, I went to work under instructions as a carpenter and stair-builder, passed three years at that, entered college in New Jersey, with no money nor friends; took care of seventeen fires the first winter, and worked at odd hours at my trades: thus I managed to get into the senior year but did not graduate, for my funds gave out. I studied three years with an architect and set up for myself. From the time that I started when nine years of age I have had to take care of myself. I hold this ground: that no man should be allowed to practice as architects unless they have had a practical training. Ship-building is the best schooling for irregular work one can get into, and the carpenter's and stair-builder's trades are the next best; and I would urge every one to take a practical course before entering architecture.

"No boy, however humble his origin, need be illiterate. All can be educated if they have the will and force of character to educate themselves. Pluck, sir, pluck, is what we want in this world. I have gone to bed many a time hungry. A three-cent stamp was an article of luxury that I seldom licked. But those days are gone by; times have changed. I remember when at school blacking the boots of the president at his request; he said when done, 'G., if you ever get to be anything, I shall tell people that you once blacked my boots.' Some of the students stood by; they were of the aristocracy, and jeered at the boot-black: one is in the Tombs at New York, some of the others are the devil knows where. The moral is, treat everybody as gentlemen and ladies, no matter if they have been mean to you, because time changes many things. My experiences I relate to students at my office from time to time. It gives them support and they know what to expect in life, — not much sympathy the poor or struggling receive."

NOTES AND CLIPPINGS.

A Monument to Thomas Jefferson. — Those who recall the lively interest that President Jefferson felt for architecture will not be surprised to learn that he left amongst other things a design for his own monument, executed by himself. This design is about to be carried into execution, Congress having at its last session appropriated $5,000 for this purpose, provided the owner of the land at Monticello, where the grave is, would deed to the Government two square rods of land surrounding and including the grave; and would, moreover, grant the public a free right-of-way to the grave over his estate.

The Jersey City Strike. — The laborers at the Jersey City Reservoir, who struck last week, have shown an unpleasant disposition to be riotous. On Friday, August 23d, the sub-contractor appeared on the ground with one hundred Italian workmen, whom he had procured in New York. The strikers who were on hand showed signs of invention in assault the foreigners, but were restrained by Commissioner Semmler, who said he would try to prevent the foreigners from occupying their places. He then went to the contractor and absolutely forbade his employing any one on the works who was not a citizen of Jersey City. To this high-handed and unjustifiable demand the contractor after much discussion was obliged to yield, although, as may be supposed, there was nothing in his contract which limited him in the matter of the domicils or the nationalities of the workmen he might employ.

Crop-Burning. — The rumors that the communists in California were bent on a wholesale destruction of the crops have been fulfilled partly in the neighborhood of St. Jose. The means adopted by the crop-burners to escape detection manifest a certain ingenuity. Investigation showed at each point where a wheat field had been fired a bent wire sticking upright in the ground. One of these wires twisted about with oiled paper, which was connected with a heap of straw, was discovered holding in its coil an extinguished candle, long enough to allow the escape of the incendiary before it should burn down to the oiled paper.

Pennsylvania's Heroes. — The sculptors who up to this time have submitted models for the statues of General Peter Muhlenberg and Robert Fulton, the men whom Pennsylvania is to honor by placing their statues in the "Hall of the Heroes," at Washington, are Howard Roberts, Blanche Nevin, Mr. Kemp, the sculptor of the Catholic Total Abstinence Fountain in Fairmount Park, Philadelphia, Henry M. Gould, of Boston, and Franklin Simmons, the sculptor of the statues of Governor King of Maine, and of Roger Williams, which now stand in the Rotunda.

Graveyard Abuses. — Converts to the rite of cremation will be strengthened in their convictions by the discovery lately made in the Jersey City Cemetery of a large vault, which is said to have contained nearly a thousand corpses in various stages of decomposition, and to which fresh additions were still making. Escape for the noxious gases arising from this decaying mass was provided through holes cut through the bank, and whence issued odors which have for years made the neighborhood unhealthy, and ultimately led to the discovery and abolition of this crying abuse. A somewhat similar case has come to light in Richmond, Penn., where the sexton in charge of the Potter's Field made it a practice to pretend to bury a corpse and, when the mourners had departed, to remove the body to an old tool house, where it remained until enough other bodies had accumulated to make it worth his while to bury them in one and the same pit.

Falling Houses. — Recently two more houses have found that it was easier to tumble into the adjoining excavations for cellars than to stand upright upon nothing. In Washington, on August 19th, the party wall of a house at the corner of Ninth and R streets was undermined and fell; and on the 3d of August a house on Mission Street, San Francisco, fell boldly into the freshly dug excavation at its side. The building, a two-story frame house, fell completely over on its side, and was wrecked and twisted out of shape. The three persons who were in the house in bed at the time of the accident fortunately escaped injury.

Manchester Town Hall. — Of the twelve subjects for the mural decoration of the great hall by the chosen artists, Messrs. Madox Brown and F. Shields, the building committee has accepted all but one, and work upon them has begun already. The Parry process will be used in their execution. The subject selected are: (1.) The Romans in Britain; Agricola builds a fort at Mamucium, A. D. 79. (2.) The Saxons' Baptism of Eadwine at Manchester, A. D. 627. (3.) The Danes; After a hard fight they seize the town, A. D. 870. (4.) Origin of manufactures; Establishment of Flemish weavers in Manchester, A. D. 1380. (5.) Early Reformation Movement; John of Gaunt, Duke of Lancaster, defends Wickliffe before the Consistory Court, A. D. 1377. (6.) Commercial Integrity; Weights and measures tested by municipal decree, A. D. 1566. (7.) Science; William Crabtree on Kersal Moor (now part of Manchester) discovers the sun's parallax by observation of the transit of Venus over it, A. D. 1566. (8.) First Blood Drawn in the Civil War; Captain Bradshaw with thirty musketeers beats back Lord Strange's army, 4,500 strong, A. D. 1642. (9.) Education; Humphrey Chetham, merchant, establishes his free school for boys, A. D. 1650. (10.) Jacobite Movement; Prince Charles Edward musters his troops in the Collegiate Churchyard, A. D. 1745. (11.) Cotton; John Kay, inventor of the "fly shuttle," is saved from the fury of the mob in a wool sheet, A. D. 1753. The subject of the twelfth and rejected design, was the "Peterloo Meeting."

Casts of Cleopatra's Needle. — Under the direction of Mr. Bullen, who, eight years ago, was sent out to India by the authorities of the South Kensington Museum to make moulds of the Sanchi Tope gateway, men have been busy of late, in taking moulds of all the faces of the obelisk for the purpose of making a cast of it for the South Kensington Museum. These moulds were to have been of gelatine, but the heat of the weather has been so great as to compel its abandonment in favor of plaster of Paris.

Granite vs. Sandstone. — The action of granite and sandstone under fire was shown lately at the burning of St. Peter's Church, Lancaster, England. The fire is supposed to have caught from a lamp which was placed inside of the organ to regulate the temperature of the instrument. The church itself, which in great part was built of granite, was completely ruined, while the tower, built of a local freestone, — around which the heat of the fire was the greatest, so great indeed that five of the six bells in the belfrey melted where they hung, — was left intact, although the granite window-jambs and sills were destroyed.

The Tour Jean sans Peur, Paris. — *Galignani's Messenger* says that the work of restoring the keep of the Duke of Burgundy's tower in Paris, a view of which was published in the *American Architect* for September 8, 1877, is about completed. The portion of the building referred to forms part of the group of schools erected by the City of Paris. It is a square edifice with embattled parapets. During a long time it was divided into small lodgings; in the great hall two stories had been constructed, and the guard-room was turned into a storehouse for ironmongery. Now the whole place is restored to its original appearance, and all the partitions, etc, have disappeared. The staircase of this tower is of particular interest to artists and archæologists.

Baalbec. — A correspondent of the *Pall Mall Gazette* says, "According to Mr. Conder, in his recently published 'Tent Work in Palestine,' the world is in danger of losing one of its wonders. The six remaining columns of the great Temple of the Sun at Baalbec are nodding to their fall. The Turks have already sapped them in seeking for the metal cores run into the joints; every frost adds something to the progress of destruction, and any winter may bring the destruction of three out of the six. These columns, seventy-five feet high, are among the noblest architectural works in the world, and the method of their erection is still unexplained."

Land Transfers in Ancient Babylon. — Mr. W. St. C. Boscawen has discovered among the contract tablets in the British Museum two documents of great interest to geometricians. Attached to two terra-cotta tablets containing deeds of sale of estates near Babylon, Mr. Boscawen found two neatly-drawn plans of the estates in question. The first of these is a deed relating to the sale of some land which took place toward the latter end of the reign of Nebuchadnezzar. It represents an estate of about eight and one half acres in area, and bounded on the northern side by the canal of the goddess Banitue. The names of the owners of all the adjacent lands are given, and the greatest care is taken in giving the dimensions of these plots of land. The whole is divided into three pairs of parallelograms, and check dimensions are taken to test the accuracy of the work. A semicircular portion on the east side is most carefully measured, both radius and circumference being given. The second plan is unfortunately in a mutilated condition, but the remaining portions show the same care and neatness as is found in the perfect one. The deed of sale in this second document is written on the reverse of the tables, and is dated in the reign of Darius Hystaspes. The value of these documents as bases by which to fix both the lunar and area measures in use in Babylonia is very great. Both these documents form portions of the now well-known series of the Ejibi tablets. Mr. Boscawen hopes shortly to publish these documents, accompanied by fac-similes of the plans and translations of the deeds relating to them. — *London Athenæum.*

European Forests. — According to the *Deutsche Industrie Zeitung*, the area still covered by forests in Europe is 730,880,722 acres, which is parted amongst the different countries as follows: —

	Acres.	Per cent of Productive Area
Russia (in Europe)	477,192,922	47.44
Austria	44,486,814	31.05
Sweden	48,532,960	75.72
Finland	35,696,942	79.76
Germany	34,961,274	27.21
Norway	25,424,523	89.93
Spain	21,335,156	26.90
France	20,641,958	15.97
Turkey (in Europe)	13,371,023	10.72
Italy	12,413,056	19.18
Portugal	2,682,176	22.90
Greece	2,235,953	33.99
Switzerland	2,032,598	27.55
Great Britain and Ireland	1,974,320	3.98
Belgium	1,139,959	17.58
Holland	929,748	8.69
Denmark	456,068	6.86

Blackboard Paint. — The *Canadian Mechanics' Magazine* says that the following is a good recipe for blackboard paint: One quart of shellac dissolved in alcohol, three ounces pulverized pumice-stone, two ounces pulverized rotten-stone, four ounces lamp-black; mix the last three ingredients together, moisten a portion at a time with a little of the shellac and alcohol, grind as thoroughly as possible with a knife or spatula; after which pour in the remainder of the alcohol, stirring often to prevent settling. One quart will furnish two coats for eighty square feet of blackboard not previously painted. The preparation dries immediately, and the board may be used within an hour, if necessary. No oil should be used.

A Luminous Clock Face. — It is said that a curious clock is about to be introduced by the Ausonia Clock Company of New York. The dial, which to all appearances is of ordinary porcelain, becomes luminous when placed in the dark, so that the hands and figures can be plainly seen, and the time easily distinguished. It is the invention of a French chemist, and is thought to be imperishable.

Durability of Pine Shingles. — It is said that white-pine shingles on the Shaker meeting-house in Canterbury, N. H., put on with wooden pins eighty-six years ago, are still in a good state of preservation.

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CONTENTS.

SUMMARY: —

The Sessions of the Congressional Labor Committee. — Two Encouraging Features of the Investigations. — Ought an Architect's Fee to be Secured by a Lien on the Building. — Some Reasons against such Protection. — An Elevator Accident in Chicago. — Recognition of the Merits of an American Architectural School. — Establishment of a Master-Builder's Course at the Illinois Industrial University. — The Rhode Island School of Design 81

RICHARD UPJOHN 82

DILAPIDATIONS 84

THE ILLUSTRATIONS: —

Hotel Brighton, Coney Island, N. Y. — House in Boston, Mass. — Design for a Cottage at Westchester, N. Y. — House in Washington, D. C. 85

CORRESPONDENCE: —

Letter from London 85

THE TREATMENT AND DISPOSAL OF SEWAGE IN CHINA 86

MR. RUSKIN ON COLOR 87

NOTES AND CLIPPINGS 88

THE sessions of the Congressional Labor Committee have continued to be more interesting than those of most commissions, not so much because of the fruits they have borne as because their subject is one which is really important to the public. The testimony of the witnesses lately examined has been less visionary than that which was volunteered at the earlier sessions; but, as was to expected, the most of it has been from persons who simply looked at the subject from the point of view of their own peculiar avocations or associations. To one the cause of the depression of labor is to be found in the decline of the shipping interest; to another in taxation; to others in protection; to others in the national debt; to others in the currency; to others in the introduction of machinery. One ascribes it to bad living and consequent sickness among the laboring classes, another to imprudence, another to intoxication. The remedies suggested are therefore generally of the nature of patent medicines. The few men who have broadly studied the condition of the country naturally confess themselves unable to point out the one determining cause or the specific remedy, while it is easy to show many things that act mischievously. It was a foregone conclusion that the work of this committee should disappoint those who expected from it any generally satisfactory explanation, or any legislative remedy. But if the people and press of the country, and especially the more sensible part of the workingmen, follow the committee with any attention, it will do a useful work in merely showing up the conflict and the absurdity of a great mass of popular opinions. It is a good thing that many wild theories which are fermenting in the dark should be thrown up into the light, and the bubbles which they generate scattered in the open air. It is also a good thing to let people whose notions are not wild but only one-sided and narrow see how little ground they cover in comparison with the whole question.

Two things meanwhile come to notice which are encouraging in their different ways, as far as they go. One is an indication that the idle condition of the laboring men is after all not so bad as it has been represented to be. Some of the testimony before the committee shows this to be the case; and a recent publication of facts by the Massachusetts Bureau of Labor Statistics shows that in that State at least, where the condition of labor has been thought to be worse than anywhere else in the country, except in Pennsylvania, the number of unemployed is much less than has been asserted. One witness had estimated the unemployed in the whole country at nearly four millions, which is something like half the entire voting population; and others have assumed that they were two hundred thousand in Massachusetts alone, which is a still greater proportion. The labor statistics of that State indicate that the number there is about thirty thousand, including men and women, or say one in fifty of the population. This is to be regretted, but when we allow for those who will not work under any circumstances, — and they are very many, — and for those who are out of work because they will not take the wages they can get, the outlook is by no means so bad as we have been told to believe. The other encouraging thing is a project which has been started in Chicago for a great shoe factory, to be owned and conducted by the workmen themselves. Such a venture as this, much as it has been talked about, is, we believe, an entirely new thing in this country. Its success we should suppose to be very doubtful; but a much more important thing, broadly speaking, if it should be set going and carried on long enough to let its working be seen, would be the opportunity it would give to an important body of workingmen — the Crispins, who have the thing in hand — to find out what the position of a capitalist really is, and to learn how much care, hard work, difficulty, risk, and perhaps loss, is involved in the management of his capital.

THERE has more than once been question among some architects in the United States as to whether an architect could and should enforce a claim for his professional fee by a lien on the building which he has carried out for a client. The impression has been that existing laws, at least in most of the States, do not give him a lien; and there has even been some talk among the profession in certain places of amending the laws so as to allow the architect the protection which the mechanic has. A late decision in a Pennsylvania court bears upon this point, and is, therefore, interesting. An architect sued for compensation for his services in preparing drawings and specifications for a house in West Chester, and for three visits, "to locate the building and explain the drawings to mechanics;" he applied for a lien in support of his charge. It appeared that only one of these visits was for the purpose of explaining drawings to the mechanics, and that this one was before the house was begun. This proved to be the turning point in the question, the plaintiff's counsel having cited a previous case, in which a lien had been granted to an architect, the judge in his opinion declared that the essential point in the previous case was the fact that the architect in charge by superintending work, inspecting materials, and examining accounts, had actually "performed work about the erection and construction of the building," which under the terms of the statute gave him a lien; whereas in the case under consideration the architect, having never seen the building, could not be said to have performed work "for or about the construction" of it, the mere making of plans and specifications not being work under the meaning of the statute. The plaintiff, therefore, had no better claim to a lien than the scrivener who copied the specification, or the surveyor who laid out the lines of the building.

SOME expressions in the published report seem to imply that in the winning case the architect, or he who sued as such, had actually done the work of the builder and even made his drawings inside the building itself as it went on. The question of work actually done at a building or away from it, no matter what its kind, is a mere question of verbal interpretation of a statute, and of no importance otherwise; but the division of an architect's work into two kinds, one of which, the properly architectural, being done at his office, is unprotected by a lien, while the other, done on the spot, the superintendence, is protected, — this division is of some importance to those who are disposed to claim such a protection. Nevertheless we must say that it seems to us very undesirable for architects to have to do with liens. It is enough, perhaps, to say that there is no better reason to urge for them than the mere fact that the existence of the buildings gives an opportunity for them. Workmen are assumed, whether wisely or not we will not pretend to judge, to deserve, or need, a special protection above other creditors. They live on days' wages, more or less from hand to mouth, and may be supposed to be in greater need than other men of making sure of prompt payment. Hence the concession to them of a special remedy. But we see no such reason, nor any other, why architects should be preferred to other classes of creditors. On the contrary there is an instinctive feeling, which we think may be trusted, that such a remedy is out of keeping with the professional relation between an architect and his client. The thought of such a special weapon held in reserve is at variance with the feeling of personal confidence which should be the characteristic of this relation. There is still too common a disposition to regard the architect's function as a mechanical one, and any such habit as resorting to liens would in its degree encourage this disposition. There is no question that the

dignity of a genuinely professional attitude is of real value in strengthening the confidence and respect which a profession inspires. Any loss of these would be poorly repaid by the very small advantages which architects could in the long run derive from liens.

The folly of intrusting to inexpert and ignorant persons the working of machines more or less complicated in their construction is made more apparent every day. The familiar experiment of trying to put a belt over shafting in motion often results in the dismemberment of the experimenter; elevators take uncontrollable flights up or down their wells, because of the ignorance of those who undertake to guide them; locomotives and stationary engines explode, generally because of the carelessness of *soi-disant* engineers; and just at this season the portable engines, which in the West are used in great numbers in harvesting the large crops, are exploding with uncomfortable frequency. These too frequent accidents are often followed by coroner's verdicts, more or less ludicrous in their award of blame. On Friday, August 23, three men loaded upon the elevator in the Rawson Building, Chicago, a piano weighing nine hundred and fifty pounds, and began to descend with it from the fifth story of the building. After going but a few feet something gave way and the elevator with its load fell to the bottom. One of the men saved himself by jumping off after the elevator had fallen about fifteen feet, another seized the brake-rope and climbed to the top, while the third fell to the bottom and was killed. The testimony at the inquest was conflicting, some experts saying that the accident was caused by the ignorance of the men on the elevator, who brought about the accident by their improper use of starting line and brake-rope; others, that the kind of brake in use on this elevator — a Stores Union Safety Elevator — was never reliable, and almost all agreeing that the machinery was not properly adjusted, shafts being out of line, and one of them two inches out of the horizontal, so that the strain was brought on one corner of each tooth of the gear-wheel in such a way as to cause a breakage. But the machinery was so wrecked that no reliable explanation could be reached. At all events, some one was to blame; for only two days before the accident new cables had been put on, and had things been as much out of order as the testimony indicates, it must have been apparent to the workmen who made the repairs. Knowing, perhaps, of the verdict rendered in the case of the elevator accident at the Grand Hôtel, Paris, and feeling that it was incumbent on them to censure some one, as it certainly was their duty so to do, the coroner's jury in its wisdom have brought in a verdict which says that "the owners of said elevator are to blame for such accident from their neglect in keeping said elevator in repair," and this, too, in the face of the testimony of the agent of the building, who declared that one of the conditions of the lease of the building was that the lessors should keep the elevator in repair.

In the published list of medals which have been awarded to foreign architects for the excellence of the designs which they this year exhibit at Paris, there is, we regret to say, no mention of an American name. Although the Trustees of the American Institute of Architects did not see fit to charge themselves with the task of gathering such a collection of drawings and photographs, as should best show what the profession has done and is doing in this country, we had hoped that some of our most able architects would send, as individuals, enough of their work to show that, though courtesy to the government commissioners may demand that the façade of the United States section on the Rue des Nations be acknowledged as typical of our architecture, it is not in achieving such results that American architects are exclusively employed. Yet the architectural talent of the country has not been passed over without such recognition of its merits as can be expressed by a silver medal, although it is to the work of the "babes and sucklings" of the profession that this compliment has been accorded. The students of the Architectural School attached to the Massachusetts Institute of Technology may indeed take satisfaction in the knowledge that this solitary laurel branch has been won by their careful work. Of the real architectural merit of this work, of the study and thought bestowed on its development, as well as of the value of the course of instruction by which it is produced, evidence is at this moment afforded by the somewhat similar collection of drawings at the fair of the Massachusetts Charitable Mechanic Association, which opened on Monday last in Boston. Although this collection is made up in great part of drawings which it was thought not best to send to Paris — of refuse material, as it were — it will well repay the careful attention of the architect, draughtsman, or student who can devote to its inspection the time it deserves.

The catalogue of the Illinois Industrial University comes to us in a more attractive form than usual, illustrated as it is by six photographic views of the interiors of several of the college rooms, notable among which are the two views of the art gallery, which show that the institution is possessed of a fair collection of casts of busts and statues, both antique and modern, while hung upon the walls and screens are a number of framed engravings and some architectural photographs. In looking through the list of students we find that out of a total of three hundred and four male and sixty-three female students, thirteen students, one of whom is a lady in the fourth year of the course, are studying architecture. In the curriculum of the architectural school attached to this institution, we have now only to notice one new feature. This is the establishment of a course for those who desire to become master-builders. The idea is excellent, and as there is apparently no intention to grant a certificate or diploma, the limitation of the course to one year's work is not as injudicious, perhaps, as it at first blush seems to be. At any rate, it is a case where half a loaf is better than no bread, and we trust that in the future there will be a large number of mechanics, both old and young, who will profit by this opportunity to obtain some portion of the theoretical knowledge which master-builders ought to possess, but which the demands of daily practice too rarely allow them to acquire. At present one student is pursuing this course, which includes instruction in wood, stone, brick, and metal construction, orthographic and architectural drawing, instruction in agreements, specifications, estimates, heating, ventilation, and architectural design, and shop-practice in carpentry, joinery, and cabinet-making. The catalogue contains no reference to the summer session of classes in wood-working and iron-working which, as we have mentioned (*American Architect*, May 25, 1878), was to be held this summer in the Exposition Building at Chicago.

Apparently the Directors of the Rhode Island School of Design have succeeded in obtaining the money which we once stated (*American Architect*, May 25, 1878) they must have, before the school to which the Women's Centennial Commission had appropriated its surplus moneys could be opened. At present rooms are fitting up in the Hoppin Homestead Building in Providence for the use of this school, which will probably open in October, as originally intended. We do not know just what is to be the course of study to be pursued, but we understand that, although it is to be essentially a school of industrial design, instruction will be given in other branches of art. The school is to be under the charge of Mr. Charles A. Barry, who for more than twenty years has been an art teacher, and during six years was supervisor of drawing in the Boston public schools. Mr. Barry is one of the eight gentlemen who, in 1858, founded the Boston Art Club.

RICHARD UPJOHN.

It is the good fortune of the successful architect that his record cannot be confined to books and papers, like those of other professional men, cannot be shut up in galleries and inaccessible houses like those of other artists, cannot be buried in the treacherous memories of relatives and friends like those of the rest of his fellow-creatures, but is permanent, visible, and out-of-doors; his whole professional career is illustrated by a series of durable public memorials. When character and opportunity so happily combine in a human life, that, in its closing, it asserts itself as a complete and symmetrical whole, thus monumentally set forth before the eyes of mankind, there seems to be no room for vain regrets. In considering the professional career of Richard Upjohn, therefore, the task of the biographer is easy and in every way agreeable; this career, moreover, is well worth tracing, with such circumstances and detail as our space will allow, not only because it is an essential part of the history of American architecture, but because it may serve as a proof that common sense, sound judgment, careful observation, energy and integrity of character, — all of them qualities more or less attainable, even for "plain people," — may combine to produce a reputation which, if not quite heroic in its proportions, is certainly great in its results. It was not by brilliant and exceptional genius that this good fortune was achieved, but be

fidelity in the development of natural gifts, and by hard work judiciously bestowed. There was more prose than poetry in this busy life, and it therefore touches our common sympathies, and runs parallel to our common experience often enough to serve as a practical example and an encouragement.

Mr. Upjohn was born at Shaftesbury, Dorsetshire, England, and after enjoying fair educational advantages, was apprenticed to a cabinet-maker, and finally became a master in the trade. But in 1829, in his twenty-eighth year, he came to the United States, and settled in New Bedford, Mass., where he followed his craft in the day-time and taught drawing in the evenings. Three years afterwards he went to Boston and entered the office of Captain Paris, who was then the architect of the Boston Court House. We soon behold him his own master again, and one of his first designs as an architect were the fences and entrances to the Boston Common. St. John's Church, at Bangor, Me., was also one of his earliest works. But his professional career may be considered as dating from the preparation of the designs for Trinity Church, New York.

This wealthy corporation, in the year 1833, had decided upon some alterations and enlargements of their old edifice, but finally found it expedient to build anew. The site was cleared, therefore, and the present church was erected between the years 1839 and 1845. It was then, and perhaps still remains, the most conspicuous religious monument in this country, and the advances since made in the science of architecture, in the knowledge of precedent, in the experience with great works, and in improved professional education and methods, has not served by comparison to dwarf its proportions or lessen its excellence as a work of art. It still holds its preëminent position with dignity and firmness.

We are not prepared to give a chronological, or, indeed, a complete list of the ecclesiastical buildings which Mr. Upjohn produced after this conspicuous and fortunate beginning; the succession is imposing in numbers, and fully sustains the high standard which he had himself set up. Among these, in the city of New York, are the church known as Dr. Pott's, on the corner of Tenth Street and University Place; the Church of the Ascension, near by, on Fifth Avenue; that of the Holy Communion, on Sixth Avenue and Twentieth Street; that of the Nativity, on the East side, St. Thomas's, Trinity Chapel and Schools, and Dr. Adams' Presbyterian Church, on Madison Square; in Brooklyn, L. I., are Christ and Grace Churches, and the Church of the Pilgrims; elsewhere the succession is marked by the Church of St. James, at New London, Ct.; St. Paul's at Buffalo, N. Y.; St. Paul's at Brookline, Mass.; St. Stephen's and Grace Church, at Providence, R. I.; the Presbyterian Memorial Church, at Springfield, Mass.; the Parish Church, at Portsmouth, R. I.; and a chapel at New Berlin, N. J. . . . . To these may be added St. Mark's, built on a steep hillside for Asa Packer, at Mauch Chunk, N. J., St. Thomas's, at Taunton, Mass., Grace Church at Newark, the Geneva Memorial Church, St. Peter's Presbyterian Church at Rochester, and Zion Church at Rome, N. Y., and churches at Salt Lake City, Millville, Mass., and Geneseo, N. Y. Mr. Upjohn also prepared plans for the Church of the Advent, in Boston, which were not carried out. He also erected wooden churches at Stockbridge and Plymouth, Mass.

> "A gentler life spreads round the holy spires,
> Where'er they rise the sylvan wastes retired,
> And rosy harvests crown the fertile lea."

Wordsworth's sonnet may be quoted as applicable also to these scattered churches, but mainly in another sense. As the first examples of pure Gothic built in a country almost entirely ignorant of true mediæval forms, they immediately dispelled the illiterate traditions of the style which were until then generally accepted as correct and satisfactory, and planted seeds of knowledge which fell not upon stony ground. Although a few excellent architects had preceded Mr. Upjohn in the field, their work had been based principally upon Renaissance types, and every effort in the direction of a Gothic revival had been made without the advantage of a recognized standard of the style. Such standards were planted wherever Mr. Upjohn's spires arose, and even to this day they may be accepted as safe guides and sound examples. Though perhaps never surprising us with new combinations of original design, never unduly imaginative and rarely poetic, his Gothic has, at least, always been sober and correct, less ingenious than learned, but by no means confined to merely common or conventional types. His churches are not marked by personal conceits.—Mr. Upjohn did not write his name upon his architecture,—but his works have all the grace which can be conferred by variety within the strictest limits of loyalty to style; and so also when he sought his effects outside of his English types, as in the Romanesque of St. Paul's Church at Baltimore, his archæological correctness was never suffered to stiffen his hand or to interfere with a just freedom of design. But his natural refinement of thought and delicacy of imagination and invention had a clearer and more fortunate field in the tombs and monuments of Trinity churchyard and Greenwood Cemetery.

Mr. Upjohn's service to the architecture of America consists in his timely appearance upon the scene, an artist at heart, a man of business and enterprise, thoroughly equipped with all the knowledge and forces essential to the propagation of pure style in a new country. It is safe to say that from the time of his first public appearance as an architect our civilization began to enjoy the emotions and appreciate the sentiment of mediæval art, which before that time had rested upon the bastard traditions of Walpole's villa at Stanberry Hill, and Beckford's Abbey of Fonthill, upon Abbotsford, and the castle of Otranto.

Although his professional career was concerned with domestic and civic works in large proportion, his reputation must repose mainly upon his ecclesiastical monuments and upon his knowledge of and respect for the Gothic style of England. His domestic work was almost, if not entirely, confined to conventional forms of Italian Renaissance, as if he considered his Gothic a thing consecrated to far more serious uses, and his dwellings were rather dignified and academical than picturesque according to the modern type. They generally stand "four square," with no playful conceits or eccentricities, no ingenious devices or far-fetched oddities of detail either in plan or elevation. His characteristic respect for monumental types followed him also in this department and chastened his faculty of invention. Among his town and country houses we are enabled to recall the Lytchfield and Packer houses at Brooklyn, that of J. H. Burch, Esq., at Chicago, of Edmund Dexter, Esq., at Cincinnati, of G. M. Atwater, Esq., at Springfield, Mass., of Jas. A. Cowing, Esq., at Buffalo, of John S. Stone, Esq., at Bay Ridge, L. I., of W. M. Stebbins, Esq., of Tarrytown, the Johnston House at Flushing, L. I., the Forsyth house at Kingston, N. Y., that of Mr. H. B. McKean, of Philadelphia, those of Messrs. E. King, Amos W. Smith, and others, at Newport, that of Mr. Wm. Mason, at Taunton, Mass., the Thayer houses in and near Boston, and those of Messrs. Seth Adams and Marshall Wood, at Providence; also the six gate-lodges of Samuel Zimmerman, Esq., at Clifton, near Niagara, the building of the mansion having been stopped by the untimely death of the proprietor. Lindenwald, the residence of President Van Buren, and the seat of the Patroon at Albany, were altered and enlarged under his direction. In all these works it is evident that Mr. Upjohn's habits of design were controlled by a sober sense of duty, and were never at the mercy of passing fashions or of his own thronging fancies; they are distinctly, and often severely, classical in conception and treatment, and, as such, being more in sympathy with the prevailing contemporary architectural idea, have hardly served, like his churches, to mark a step of artistic progress far in advance of his time.

In civic buildings Mr. Upjohn's experience was more limited, but in this field also he preserved his characteristic sobriety and correctness. He built Trinity Building and the Corn Exchange Bank in New York, a savings bank at Kingston, N. Y., a school building at Brooklyn, a hotel and public school at Taunton, Mass., and a railroad station at Norton, Mass.; he also designed a chapel for Bowdoin College, a library for Brown University, and had prepared complete drawings for the proposed new Columbia College buildings which were to have occupied one of the blocks in the vicinity of the Roman Catholic Cathedral, when the old Deaf and Dumb Asylum property was secured for this purpose and the new project abandoned.

Although Mr. Upjohn prepared designs for the city hall in Brooklyn, and, in 1855, for the state library building at Albany, with the understanding, we believe, that he was not the only architect who had been invited to do so, these were exceptional cases, and his attitude of hostility to architectural competitions was assumed with deliberation and maintained with decision and self-denial. He lost no opportunity of impressing upon the younger men in the profession the importance of maintaining the dignity of their calling by abstaining from especial bargains with reference to their fees and from all competitions which implied volunteer or unpaid labor. The tone of his annual addresses as President of the American Institute of Architects was always very earnest in claiming for the profession a

social and moral position far in advance of that which it had hitherto occupied; and his theory was strengthened and illustrated by his own example of honorable practice. Indeed, his service to American architects was quite as important as his service to American architecture; no one in the profession took a more active part in the planting and cultivation of that wholesome sentiment of fraternity and mutual support which first found expression in the founding of the Institute in 1857.

From that time to the year 1876, when he resigned the office of President, which he had held from the beginning, he was unceasing in his efforts, so far as his powers and opportunities allowed, to raise the standard of practice and to illustrate the advantages of union and good-fellowship among all the members of the profession. For this service his memory deserves to be cherished by his brethren. A complete memorial of his professional experience and observation would necessarily include the history of the greatest development which our art and the practice of it have experienced in this country.

His national position was recognized by his election as honorary member of the Royal Institute of British Architects, and of the Institute of Portuguese Architects. What other honors may have been conferred upon him by foreign societies we are not prepared to say; but certainly the large tribute of affectionate respect bestowed upon him by those who have known him personally, who have worked with him and watched his successful career, who have been counselled and encouraged by him, is far more significant than any merely official recognition, however graciously accorded.

DILAPIDATIONS.

Our purpose is to give some details concerning the Law of Dilapidations as it now stands, and to examine a few typical cases of its application which have come under our notice, and which will serve to show by practical illustration the disadvantages, as well as the benefits, which accrue to the Church and the clergy by the present working of the law.

Let the results, however, of our former inquiry[1] be constantly borne in mind, which are these, namely, that the original statute Law of Dilapidations is still in force, with the single exception of the clause relating to the priority of the debt of dilapidation-money over other debts; that this law is a good and equitable one, which no one complains of; and that it is in the mode of application of the law only that a change has been made, which bears heavily, and, we think, unjustly, upon the mass of incumbents and as we shall see, tends more and more every year to defeat the main objects aimed at by the framers of the Act of 1871.

We may supplement our former general statement by the following details. Every incumbent is bound both by statute and common law, to keep his house of residence on the glebe in repair and to restore or rebuild it, if necessary, without addition, alteration, or improvement, out of the income of the living; but if it is too small or mean, it may be enlarged. He must insure it against fire in some office approved by Queen Anne's Bounty, and for a sum agreed upon with the patron and ordinary. There is no liability as to the mode of cultivation of the *land* attached to a living, but the fences, farm-buildings, etc., must all be kept in repair, and come thus under the law, even if they have been erected by himself. Timber on the glebe may, of course, be felled, but only for repairs necessary to the buildings or fences, and wood may be cut, but only for necessary firing. The sale, among other personal effects, of faggots, etc., cut on the glebe, which we sometimes observe in auctions held by the executors of a deceased incumbent, is altogether illegal. Most of the fixtures and additions, which in the case of ordinary tenants would be removable, are not removable; nor, as we said before, is any charge made for dilapidation of *inside* paint and paper. But the successor to a vacating incumbent may compel the removal of all additions made by his predecessor, if they are of an unnecessary character, and would encumber the living, such as hot-houses, aviaries, etc., and in default of removal, the expense of getting rid of them would be charged as dilapidations.

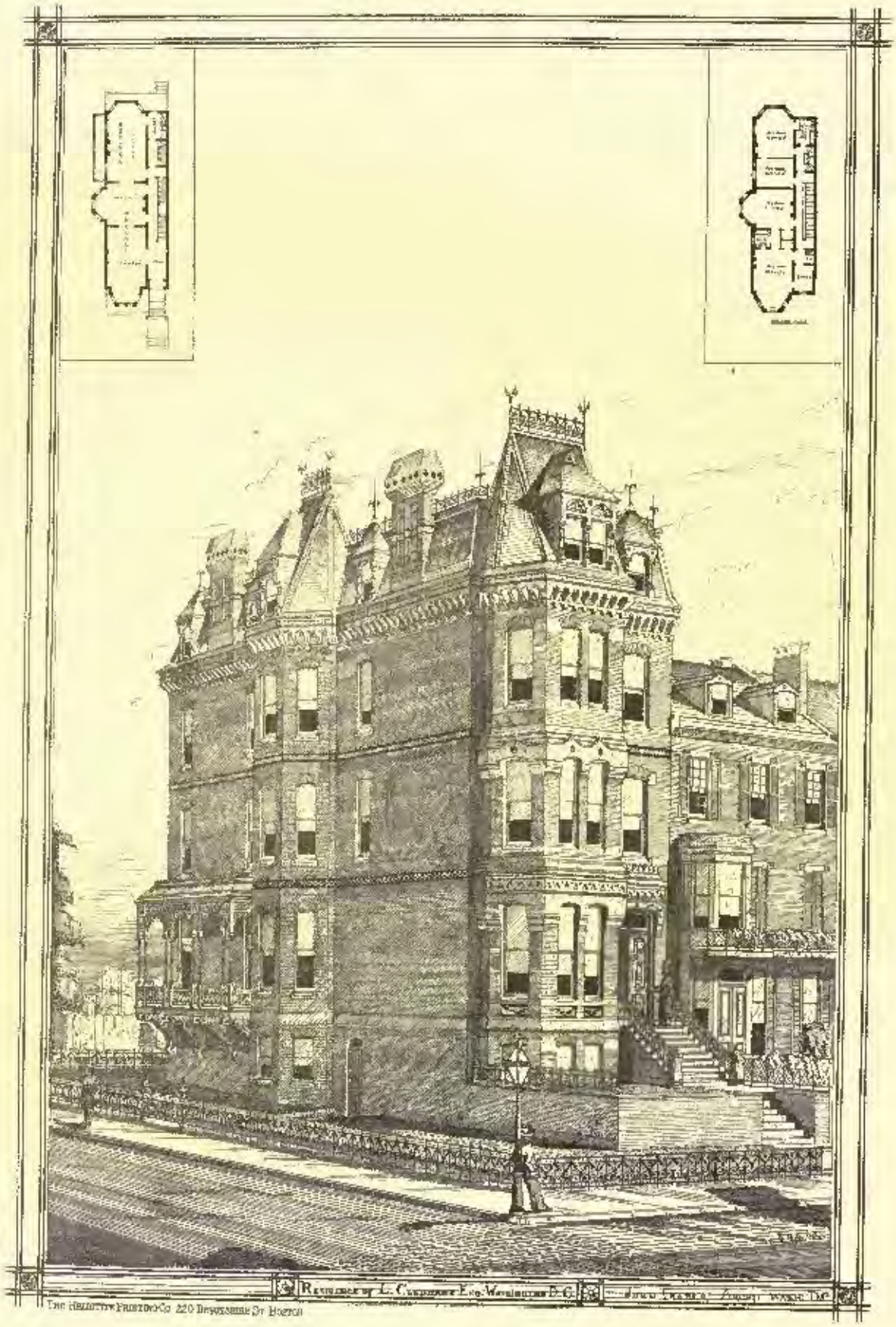
Now all this is very right and proper, with perhaps the single exception relating to the *land*. An incumbent will not be likely to leave his land altogether uncultivated and fallow; he is, however, tempted to exhaust it, and so to reduce the income of his successors; as, for instance, by selling off the hay-crops by auction every year at their highest price, and neglecting the proper manuring of the land afterwards, whereby the soil is much deteriorated. Some action with regard to the *land*, as well as the *buildings*, of a living might perhaps have been desirable in the new law. But this is a minor point. Let us rather see how the new law works in practice. And first, as to the appointment and remuneration of surveyors. We must remember that they are appointed for each diocese by the rural deans, and that, in most dioceses, the main part of their remuneration consists, besides fees, of a percentage on the amount of the work ordered by them to be done. Here, then, are two points not quite as they should be. Not only is the surveyor naturally tempted to make his estimate too high, with the view, unconsciously no doubt, of increasing his percentage on it, but when the work is done and paid for, if the contractor, as is often the case, performs the work for less than the estimated sum, the surveyor still gets his percentage on the estimate, while the difference between the estimate and the actual sum disbursed is not returned, as one would naturally expect it would be, to the incumbent who has to pay, but is kept for further repairs hereafter! This is unjust to the outgoing incumbent. Take a case, in illustration, which has come under our notice. We will call the Benefice A. Here the estimated cost of dilapidations amounted to £66, and the repairs were all executed to the satisfaction of the surveyor and a certificate for the five years' exemption from further liability given, for the sum of £361. So that the late incumbent of A has had to pay £30 more than he in equity should have done. For dilapidation money is a debt from the old incumbent to the new incumbent, and from the new incumbent to Queen Anne's Bounty, who seem unable, for some reason or other, to return any money once paid to them.

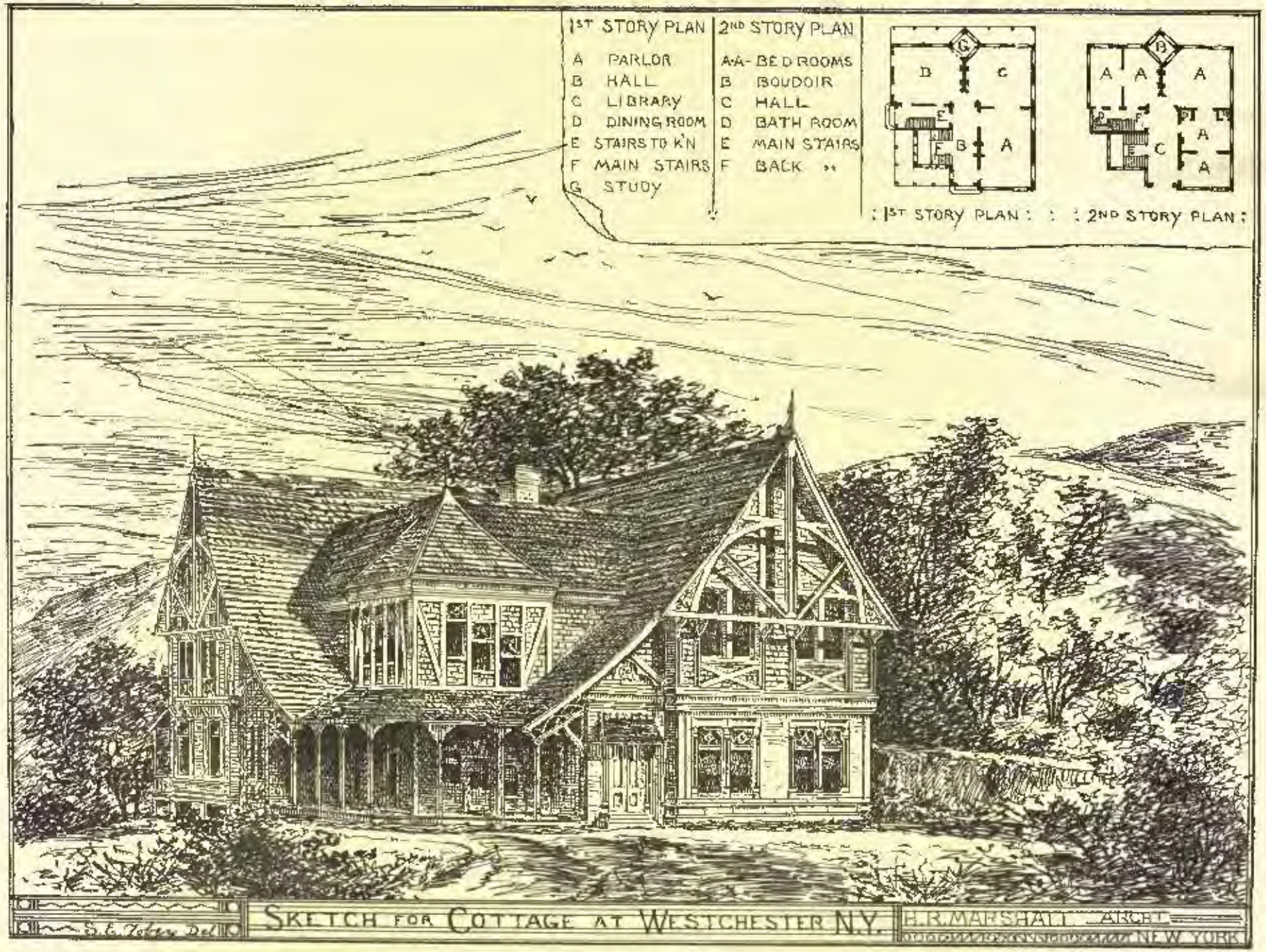
Again, not only does thus the outgoing incumbent, or his executors, suffer hardship, but the incoming incumbent must look carefully to see that he himself is not made to undergo something still worse. For while the former has no fees to pay to the surveyor for his work, and has his liability limited to the payment of the actual sum specified for dilapidations, all the onus, risk, and fees fall upon the latter. If, for instance, the old incumbent is bankrupt, the new incumbent is still bound to pay over to Queen Anne's Bounty, within six months of his induction, every farthing of the dilapidation money, which, as in such case he cannot get it from his predecessor, he must pay out of his own pocket, or, if allowed to do so, he may in certain cases mortgage the benefice, and so reduce its value, suffering thus, in any wise, a hardship which, although the law justly proposes to ease it for him, Queen Anne's Bounty, as we remarked in our previous article, is at present unwilling to act upon so as to help him by a loan. A case of this kind is that of Benefice B. Here the living was worth only £150 a year. The dilapidations amounted to £609, for the house was old, and there were large out-buildings. The incumbent who died left no effects whatever. He was an old bachelor, who had simply lived on his income. The new incumbent, also a poor man, took the living without much consideration, and was instituted and inducted, and thus irrevocably bound to pay over *at once* four years' income before touching a penny of the endowment! Doubtless he has often wished that his bishop had left him in his curacy. Observe how careful the Act is to provide a remedy for such hardships, and contrast with it the action of Queen Anne's Bounty in refusing loans sanctioned by the Act. We can give even a worse case than this in Benefice C. Here the late incumbent was appointed in 1868. The living was worth £120 a year, and he died in 1871, leaving only a daughter, and the sum of £1,000 in consols. The surveyor ordered the house, which was a timber building erected on piles, and much dilapidated, to be entirely rebuilt at a cost of £818! Here was a poor incumbent mulcted of more than all he had ever received from his living during the six years of his tenancy, and his daughter left penniless, only because he had the misfortune to be one of the incumbents of 1871, for whom special provision was made in the Act, and Queen Anne's Bounty has made that provision a dead letter!

But, it may be asked, cannot persons in such circumstances appeal against these hardships? Is there no way of softening down such cases? Yes. In the case of Benefice C, the appeal was suggested against the surveyor's award in the manner prescribed by the Act for cases of appeal. But, with the advice of counsel, the matter was dropped, and no appeal was made, for the simple reason that the law directs that the whole costs of appeal shall be paid, and the whole expense of re-valuing disbursed, out of the estate of the outgoing incumbent instead of out of the living, and the sole executrix of this poor person was willing rather to submit to pay the whole sum demanded than risk the charges and anxiety of litigation.

The diocesan surveyors, who are generally architects and men of good standing and honorable dealing, are gradually through practice becoming more acquainted with their new duties, and, we trust, more lenient in their awards; but their first introduction to a comparatively new experience created by the Act naturally tended to lead them to proceed more according to the strict letter of the law than according to equity; while it was the cause, especially with those surveyors who live in London, of some curious manifestations of ignorance about agricultural and local customs. In certain parts of England, for example, all the fences round fields are composed of loose stone walls without mortar or cement. One surveyor ordered all such walls to be rebuilt with cement on the glebes. This was, of course, too absurd to be acted upon, and he had to revoke his order, after learning a little about the habits of the district. Another surveyor that we had heard of, though we have not had the pleasure of actually meeting him, directed that all the pig-styes should be painted within and without with three coats of white paint! Other surveyors seem puzzled by the differing local customs, whereby, in some parts, all field gates are painted, while in other parts of the country such a thing is never heard of. Most of them, however, seem to be agreed that it shall be part of their duty to order the painting of all external wood and ironwork not painted the year before with two coats of paint, to empty all cess-pits and drains, and, in general, to put things in complete readiness for the new tenant.

[1] *Building World* for December, 1877.

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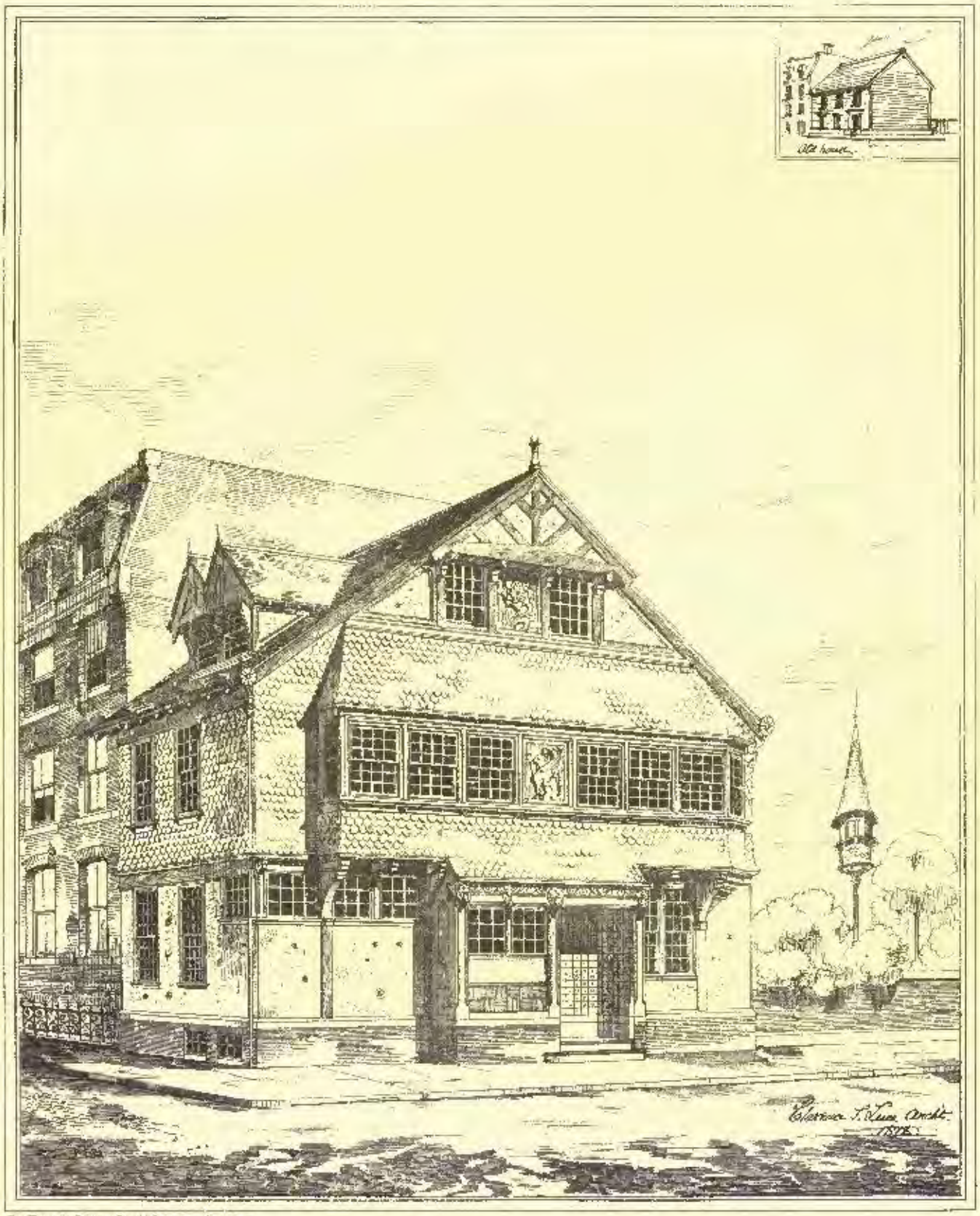

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— BOSTON, MASS. —

Our readers will doubtless be glad to have all the items in an average and typical case, which we will call that of Benefice D. This will enable them to see more clearly how the onus is divided. It is as follows: —

1. *Schedule of Dilapidations* (Benefice D), October, 1872: —

Stop round sash-frames; leak round chimney; mend panes of glass; cut out cracks and stop ceiling; repair chimney-piece; new keys and locks; mend decayed flooring; repair plastering; lead lights; repair door and cupboard; new nosings to stairs; repair treads, risers, newels, and balusters: new collar to roof; repair decayed sleepers and joists; renew skirting and rafters; repair soil-pipe, and empty cess-pit; new sills to doors; mend and renew thatching; renew stucco on walls, and paint; new eaves-gutters; scarf door-posts; repair and paint field-gates; paint all outside iron and wood. — Total, £61.

2. *Fees paid to bishop's officers*: —

Secretary's order for inspection, £1 1*s.*; filing order by registrar, 3*s.* 4*d.*; copy for Queen Anne's Bounty, 5*s.*; secretary for bishop's consent to alter plan, £1 1*s.*; filing it by registrar, 3*s.* 4*d.*; secretary for bishop's countersignature to surveyor's certificate for payment, 5*s.*; registrar for filing surveyor's certificate of execution of work, 3*s.* 4*d.* — Total, £3 2*s.* 0*d.*

3. *Surveyor's fees*: —

Survey, valuation, and reports, with two copies, £5 5*s.*; travelling and other expenses, £2 8*s.* 6*d.*; survey and certificate, under section 44 of the Act, £1 11*s.* 6*d.*; expenses, 10*s.* Total, £9 15*s.* 0*d.*

Here the £61 is paid by the late incumbent's executors to the new incumbent, and by him to Queen Anne's Bounty, while the new incumbent pays all the fees of both bishop and surveyor.

We are glad to find that the case of repairs to parish churches, mentioned in our former article, appears in a fair way of being settled. It arose thus. The Church of All Saints in Lambeth is one of those built under the Church Building Act, which enacts that, as in the case of all other churches, the freehold shall be in the incumbent, but that all repairs shall be done at the expense of the parishioners. This church had become so far out of repair as to be unsafe to passengers along the street, and, in fact, a portion of the tower fell not long ago, and seriously injured a woman. The incumbent, Dr. F. G. Lee, was called upon by the Metropolitan Board of Works to repair the church, as church-rates had been abolished without any provision being made for the maintenance of the fabric, and no one else could be made to pay. The order of the Board, if allowed, would have become a precedent for making every incumbent in the country responsible for the repairs of his church, as well as of his house, and would have thrown an intolerable burden on the clergy. Dr. Lee refused to do the work, and the Board, acting under the provisions of the Metropolitan Building Acts as to repairs of "dangerous structures," then did the work, and sued the incumbent for £105 incurred in the operation. Dr. Lee, supported by his bishop, declined to pay, and showed, at the trial of the case, that his freehold in the church was by no means the same kind of freehold as that of an ordinary proprietor, and that he was unable to sell the church, or raise money upon it to pay off the debt. Although the Lord Chief Justice has acquitted the clergy of the responsibility thus sought to be imposed upon them, and so far justice has been done, we are, however, still without legislation on the subject of the important question, Who *is* to keep the Church in repair? The clergy are clearly not liable. The laity refuse to have church-rates. Can we depend on voluntary help? We fear not, in the case of most parishes at any rate.

In conclusion, what is the result, so far as benefices are concerned, at which we are arrived in the present state of the dilapidation question? We are sorry to say that the mode of application of the law is still tending to defeat the object of it. Two practical rules appear to be gaining acceptance with the clergy, forced upon them by the circumstances to which we have alluded. The first is, to take more than ordinary precautions in accepting a living, and to decline to take anything under a really valuable benefice if there is the least suspicion of insolvency in the case of the outgoing incumbent, or if the repairs are likely to be a serious matter. This tends to prevent really good and hard-working men, if poor, from entering the Church, or it keeps them down as mere curates, in which position their £150 or £200 a year is quite unincumbered. The second rule is, having once taken a living, and got settled, to do absolutely nothing more towards the preservation of the buildings, except the merest necessary repairs against weather, without which the house would be uninhabitable; and for this reason that, since the surveyor must find something to survey, and has in so many cases ordered things absolutely at variance with the ordinary rules of the craft, it is much cheaper, so they say, in the long run, for a poor incumbent to pay more in comparison on his voidance of the benefice, than to be constantly compelled to repair bit by bit every year. It is true that the bishop or archdeacon may compel proper repairs during the life of the incumbent, and may deprive for neglect; but unless this is acted up to better than it is at present, or unless some change is introduced into the working of the law, and especially into the attitude which Queen Anne's Bounty takes up towards the clergy, we fear that this demoralizing effect will be only increased, instead of diminished, as time goes on. — *The Building World.*

THE THEATRE AT MILAN. — The centenary of the famous Teatro della Scala is to be observed by the redecoration of the building.

THE ILLUSTRATIONS.

HOTEL BRIGHTON, CONEY ISLAND, N. Y. MR. JOHN G. PRAGUE, ARCHITECT, NEW YORK.

HOUSE ON MT. VERNON STREET, BOSTON, MASS., REMODELLED BY MR. C. S. LUCE, ARCHITECT, BOSTON.

This sketch shows the alteration in the house at the corner of River and Mt. Vernon streets, belonging to the estate of Mrs. Martha Smith. The old house was built about 1840, and was an uninteresting structure. The alteration was made in the early part of the present year, at a cost of $2,000. The first story is of cement, plastered, and is not a concrete wall, and the second story is of tiles made at Akron, Ohio, which are the first of the kind ever manufactured in this country, after an English pattern. The manufacturer states that he ruined nearly 20,000 tiles before he was successful in getting the 5,000 used on this building, and even these are not altogether satisfactory in color. The carving in the panels is of pine. The late Inspector of Buildings was averse to allowing the alteration under the Building Act, it being a wooden building and within the fire limits, but Mr. Darrell took a different view of the matter, and very kindly allowed it. The upper sashes of the first-story windows are filled with cathedral glass, and the dining-room is decorated by Mr. Frank Hill Smith.

SKETCH FOR A COTTAGE AT WESTCHESTER, N. Y. MR. H. H. MARSHALL, ARCHITECT, NEW YORK.

HOUSE OF J. CLEPHANE ESQ., WASHINGTON, D. C. MR. JOHN ERASER, ARCHITECT, WASHINGTON.

CORRESPONDENCE

THE EXHIBITION OF TURNER'S WATER-COLORS. — MR. RUSKIN'S PRESENT ESTIMATE OF TURNER'S METHODS AND GENIUS.

LONDON, August 15, 1878.

An exhibition of unusual interest closed here last week. It was a collection of water-colors and studies by Turner, belonging to Mr. Ruskin, who prepared a catalogue, with copious notes on each sketch; to this was added, also with explanatory and critical notes, a series of the Oxford professor's own studies in line and color. The severe illness which last February struck down Mr. Ruskin threatened to prevent the completion of the catalogue, but the Rev. W. Kingsley, an old and valued friend, came to the rescue and added the concluding notes, which, to judge from the enthusiastic foot-notes Mr. Ruskin was able subsequently to add, are worthy examples of Turner worship. This pamphlet of some one hundred and forty pages is of deep interest, expressing as it does the latest, and perhaps the last, opinions of the author of "Modern Painters," whose views are known to have undergone such marked modifications that he has persistently refused to yield to the demand for a cheap and popular edition of his earlier works. His writings of late have all been fraught with weariness and bitter disappointment, which in these last productions are suddenly changed to a tone of sadness and almost of gentleness, strange indeed in the author of those scathing early polemics. With the exception of a constant and really puerile protest against the march of civilization in desecrating with its works of engineering the picturesqueness of nature, his only denunciation now is of himself, and contemporary art escapes scot-free. In his preface he manfully turns upon himself, saying, "As in my own advancing life I learn more of the laws of noble art, I recognize faults in Turner to which once I was blind; but only as I recognize also powers which my boy's enthusiasm did but disgrace by its advocacy." In the notes themselves his disciples must be startled by occasional reservations and criticisms of Turner's work which they would never have dreamed of permitting to themselves. Think of his speaking of the large water-color, the "Battle of Fort Rock" in the National Gallery, as an inferior work, terribly forced and conventionalized! and saying in regard to one of the earlier Italian studies: "It fails in many respects, especially in the ludicrous figure; he was not yet able to draw either the figure or even animals with skill." Further on: "In both, however, the trees are still very rudely drawn." Of a later study, done, however, in his prime, he says: "It will, I hope, put an end (with No. 28) to the ordinary notion that Turner 'could not draw trees.' But it may very well encourage the also very ordinary, and much better founded notion that he could not *color* them. His dislike of fresh green is a curious idiosyncrasy in him; no drawing exists, that I know of, founded frankly on that key of color." Could Turner's bitterest critics have made a severer stricture upon him as a landscape painter than to say he could not color trees? I quote these examples to show how time has changed his former partisan opinions. Yet through all, the old love and admiration consecrated by so many years of devotion to his hero is his ruling principle, softened only by a weary sadness revealed in his conclusion to the Introduction: "Oh, that some one had but told me in my youth, when all my heart seemed to be set on these colors and clouds that appear for a little while and then vanish away, how little my love of them would serve me when the silence of lawn and wood in the dews of morning should be completed, and all my thoughts should be of those whom, by neither, I was to meet more!"

The sketches are classed in five groups, corresponding to as many decades, beginning with the year 1800. The first group is character-

ized thus: "His manner is stern, reserved, quiet, grave in color, forceful in hand." They, in fact, partake of the prevailing fashion of water-colors at that period; for at the end of the last century, water-color drawings — as the English still call them — were literally such, pencil or ink drawings, with simplest pale flat washes. In speaking of one of this group, in which a portion is quite finished, leaving the rest outlined on the untouched paper, Ruskin says: "I can never get the public to believe, nor until they believe it can they ever understand the grasp of a great master's mind, that, as in fresco so in water-color, there can be no retouching after your day's work is done. . . . . There is absolute demonstration in this, ... that Turner did his work bit by bit, finishing at once and sure of his final harmony." This certainly was not the ordinary method of English water-colorists, but it is, curiously enough, that of the present Italian school; for the latter in their figure studies completely finish, beginning with the head, each bit of drapery, often without even sketching in the rest, which results in purity of color at the expense of relative values.

In regard to the second group, which comprises pictures of Swiss scenery, he writes: "And observe generally, Turner never, after this time, drew from nature without *comparing*. His lightest pencil sketch was the plan of a picture, his completest study on the spot a part of one. But he rarely painted on the spot; he looked, gathered, considered; then painted the sum of what he had gained, up to the point necessary for the one note of it." An admission which the upholders of Turner's more forced effects would do well to mark, as it allows to individual criticism a bolder judgment of the truthfulness of the scene presented than would be used in face of studies made on the spot. Of notes made for some of his Swiss pictures near the close of his life, Ruskin also says: "His way was, therefore, to make rapid pencil notes of his subject on the spot; and, it seems, at his inn in the evening to put so much color on this outline as would recall the effect to his mind." This habit explains, but does not excuse, the false values constantly found in Turner's works, more especially in his foregrounds, for his notes recording chiefly atmospheric and distant effects, he was left to compose from *this* those very parts of his work which most demanded local study.

There is real frankness in this reference to a landscape of his middle period: "But he has missed his mark in the vermilions of the foreground, which fail in distinction of hues between sunlight and shade; the violently forced shadows on the field (false in form also) not redeeming the want of tone, but rather exhibiting it." A just criticism, but one which impartiality would apply not to this example only, but to the majority of Turner's foregrounds, for there is a great similarity among them: the same crude greens and yellows to give aerial effect to the distance, the same grotesque figures outlined in vermilion and without real solidity or modelling to give relief.

Referring to these almost invariably grotesque and brutal figures, Ruskin philosophizes thus: "I think it will be seen that much of what the public were most pained by in Turner's figure drawing arose from what Turner himself had been chiefly pained by in the public. He saw, and more clearly than he knew himself, the especial forte of England in 'vulgarity.'" Then referring to these figures drawn from low life, he adds: "With all this, nevertheless, he had in himself no small sympathy; he liked it at once and was disgusted by it; and, while he lived in imagination in ancient Carthage, lived practically in modern Margate. I cannot understand these ways of his; only be assured that what offends us in these figures was also, in a high degree, offensive to him, though he chose to paint it as a peculiarly English phenomenon, and though he took in the midst of it, ignobly, an animal English enjoyment, acknowledging it all the while to be ugly and wrong." This wanton brutality in his figures increased as he grew older. Failing at first apparently from sheer inability to draw his forms and then later impatiently slurring or exaggerating them, he transformed them into defiant caricatures. But his apologist finds a more poetical reason, and of his middle period says: "Thenceforward he shows clearly the sense of a terrible wrongness and sadness, mingled in the beautiful order of the earth; his work becomes partly satirical, partly reckless, partly — and in its greatest and noblest features — tragic." Further on: "With this change of feeling came a twofold change of technical method. He had no patience with his vulgar subjects, and dashed them in with violent pencilling and often crude and coarse color, to the general hurting of his sensitiveness in many ways." In conclusion: "But assuredly, whether faithful or fated, real conditions of error affect his work from this time forward, in consequence of which it in many respects greatly lost its influence with the public. When they see, gathered now together in one group, examples of the drawings in which the calamitous change is expressed most clearly, the public may, perhaps, see how in the deepest sense their own follies were the cause of all that they blamed, and of the infinitely greater all that they lost." Rather hard, that, on a public which was inclined to believe as Mr. Ruskin now does, before his eloquence persuaded it that Turner's art was perfect and above all reproach. The English public have now so well learned their lesson that one has only to stand near the Turners in the National Gallery to hear one monotonous stream of adulation. The public *dare* not criticise Turner, — it would be "bad form." Is it a suspicion of this which has finally opened Mr. Ruskin's eyes to some of his hero's defects? Does he begin to realize that blind admiration of Turner may, after all, be but little better than that similar faith in Claude which he was at such pains to uproot? Be this as it may, of those paintings in the National Gallery, which by the beauty of his early writings he has — to the mere reader, at least — forever endowed with the most wondrous powers, he now says: "But they rotted, rent, faded, and mouldered away in miserable patches of variously deforming changes, *darkening* in spots, but to the rich colors bringing pallor, and to the subtle ones absolute effacement. Cleaning and retouching over cranks followed, and the ruin is now total."

I have quoted so largely, thinking it unlikely that this catalogue, in spite of its deep significance, would reach America, and that the many followers of Mr. Ruskin there can but be interested in this revision, in his maturity, of more youthful opinions. I have selected the passages with the design of simply illustrating this change of tone, and in no unfair spirit, for the beauty and power of Mr. Ruskin's writings command my sincere admiration, — always making due allowance for the exaggeration which keen partisanship drove him into. The collection of drawings itself is a fairly representative one; the drawings showing little that is unusual in style or power (at least to this generation) among the first half, and the latter containing — in spite of the fine collections Mr. Ruskin has generously given to Oxford and Cambridge — some of the most perfect examples of Turner's genius. This is perhaps best characterized in the poetical — sometimes wild — flight of his imagination, controlled rather by the laws of composition than by those of nature; his daring and original conception of effects encouraging him to force them in a way which, however beautiful the harmonies of color may be in themselves, can but seem unnatural to literal students of nature. R.

TREATMENT AND DISPOSAL OF SEWAGE IN CHINA.[1]

Her Majesty's Secretary of State for Foreign Affairs has been good enough to obtain, at the request of the Council, the following reports on the treatment and disposal of sewage in China: —

THE TREATMENT AND DISPOSAL OF SEWAGE IN PEKING.

Peking is fairly well supplied by water. In addition to the numerous surface wells within the walls of the city, the water of which is hard and charged, especially during the rainy season, with organic impurities, which percolate the porous sandy soil, there is an abundant supply of purer and softer water, derived from the springs and lakes of the vicinity of the summer palaces, situated at the foot of the western hills, some eight miles distant. A wide stream runs to the northwest angle of the city wall, where it opens out into a large reservoir, in which the water is confined by dams, the surplus supplying the city moat. From this reservoir the water is conducted by a canal which, after passing under the north wall, expands into several large lakes, from which proceed two canals which traverse the Tartar city. The Chinese city is similarly supplied by a small river, which flows from the Nan Haitzur, the vast southern hunting park, and ends in the moat. The water from these sources, after traversing the two cities, ultimately finds its way into the Tungchow Canal.

The sewers intersect the city in a rectangular network, and open into the canals. The wide parallel streets have a large sewer on either side, into which open the smaller sewers from the lanes. The main sewers are square in section, of diameter sufficient to allow a man to crawl through them, and are constructed of large bricks, and covered with a layer of stone slabs. They are intended principally to carry off the flood of rain-water which inundates the city in July and August. This elaborate system, however, is all but useless, having long since fallen into ruin from decay and neglect. Some of the sewers project high above the level of the roadway, gradually worn down by traffic. All are chronically choked with animal and vegetable *débris*. It is the common practice of the inhabitants to remove one of the flagstones in front of their houses, and to throw in all the refuse, solid and fluid, so that the sewer becomes merely a focus of putrefaction. The putrid contents overflow into the streets after rain, and in dry weather are tapped for the purpose of watering the roads. In short, the sewers in their present condition are not only useless, but absolutely prejudicial to the public health.

The only detail of sanitary work which is at all efficiently performed is the removal of faecal matters. The fluid excreta are either poured into the roadway or open sewer, or scattered over the street at sunset to lay the dust; but the solid excreta are most carefully collected, as in all other parts of China, for use as manure. They are removed entirely by the dry method. There are no cesspools in the houses, only a shallow hole lined with bricks, which is emptied daily by the scavenger. This is a regular business and means of livelihood in Chinese cities, and the man with a large wooden tub suspended on his back by means of a wide hoop passing over the shoulder, and a long-handled iron scoop in his hand, is a well-known figure in the streets. He does his work, as a rule, gratuitously, passing from house to house till his tub is full, when he carries it to dispose of the contents at one of the depots or manufactories. Another man wends his way along the public highway, where he also is able to pick up a fair livelihood, for the common Chinaman never scruples to halt by the wayside, even in broad daylight, and in full view of passers-by. The scavenger often digs holes in the ground of the more retired corners within his circuit, for the convenience of the wayfarer and profit of himself.

The matters collected in this way are carried to one of the depots, whence they are conveyed outside the city in wheelbarrows, with a

[1] From the *Journal of the Society of Arts.*

central wheel of large diameter, and on each side of the wheel a long coarse wicker basket, of the estimated capacity of two cwt. The wheelbarrow is driven by one man, who supports it with a yoke over his shoulders, and is assisted by one or more other men dragging with a rope in front. These baskets are quite open at the top and, being conveyed through the streets at all hours of the day, they are an insufferable nuisance. Within the walls of the city itself, moreover, there are not a few manufactories of manure, and, in fact, any large vacant piece of ground is usually utilized for this purpose. The excreta are first emptied into large holes dug in the ground, then spread over the surface in a layer about an inch thick, and constantly turned over with a spade until they become thoroughly dry. This process takes three or four days, the ground being dry and sandy, and the air remarkably free from moisture during ten months of the year. The manure, when dry, is piled into heaps, and sold retail by the small basket. A ton of this *poudrette* is estimated to sell for about sixteen shillings of our currency, which is the equivalent of a month's wages of a laboring man in this part of China.

It is a principle in native husbandry to apply manure to the plant rather than to the soil. The *poudrette* is sown with the seed or supplied to the root of the growing vegetable before irrigation.

In connection with this subject a condensed note on the comparative prevalence of certain diseases may be appended. Entozoa are very common in China. The natives scrupulously avoid drinking unboiled water, but, on the other hand, they are fond of raw and half-cooked fruit and vegetables. An unusually large proportion of children come to hospital suffering from the pressure of lumbrici. Tænia is also often met with, the result of the universal consumption of pork, which is, besides, not infrequently infected with trichina. The pigs are allowed to wander through the streets, and foreign residents are obliged to refrain from native pork. Of zymotic diseases dysentery and diarrhœa are prevalent, and especially dangerous after the rains, and appear to have direct relation with the amount of heat and moisture. Typhoid fever is a rare disease all over China, although typhus, diphtheria, scarlatina, etc., are rampant in the large cities. The rarity of typhoid may be directly due to the system of the removal of human excreta, preventing the contamination of water.

S. W. Bushell, B. Sc., M. D., Lond.
Univ. Scholar, Physician to H. B. M. Legation.

PEKING, 13th February, 1878.

TREATMENT OF SEWAGE IN CANTON.

In all parts of the city of Canton there are public latrines erected, consisting of a number of compartments separated by a wooden partition. These are the property of the "Kai-fong," or street organization, who, by the money derived from their rental, contrive to defray a considerable portion of the municipal expenses. The solid and liquid excreta collected separately from these receptacles, which are only used by men, are removed daily to the fields in baskets and buckets. The night-soil from private dwellings is carried away daily by women employed for the purpose, who empty and wash the utensils, and convey the matter to boats built specially for this object, by which it is taken into the agricultural districts, that from Canton going chiefly to the Tungkwan district. The solid excreta are usually partially dried before being used as manure, and are occasionally mixed with ashes. Liquid manure is very largely employed for watering vegetables. Every country village has on its outskirts a pool or tank, on the banks of which latrines are built, and into which the sewage flows. In the winter the liquid is drained off, and the solid deposit at the bottom, which is rich in fertilizing matter, is dried and used as manure.

The sewers in the city of Canton are cleared out triennially by the authorities, and the deposit carried off to the fields. But besides this, the liquid black matter which collects is taken away from time to time, when considered sufficiently rich in fertilizing matter to pay the cost of removal, by men who obtain access to the sewer by removing a stone from the pavement.

The foregoing is all the information I have been able to obtain upon the subject.

H. HANCE,
H. M. Acting-Consul at Canton.

CANTON, March 28, 1878.

TREATMENT OF SEWAGE IN FOOCHOW.

SIR, — In reply to your despatch, No. 1, of the 25th ultimo, on the subject of town sewage, I beg to offer the following information: —

In the town and suburbs of Foochow there are drains under the main streets only, the side lanes being without; the scourings of the dyers and pulse makers, together with the waters and slops of dwellings and shops, compose a sewage of dark and rich consistency made up from the silting of the river tides which wash the drains. It is much sought after for the purpose of enriching ground set apart for rice cultivation in its natural state. There being none but public privies, human excrement is emptied into the street, and is fetched, in pails, from long distances in the country by gangs of men and women, and then cast into open pits, lined with chunam, until wanted for manure. When diluted with two thirds of urine and water, the market gardeners sprinkle it over the cabbages. Millions of tubs of this description of manure are employed in this way, to quicken the growth of vegetables, potash being in a few instances added to the composition. No part of this valuable manure is lost in sewers, while the cost of its transport into the country must be enormous.

There is not much difference in the method of manuring in any of the provinces south of the Yellow River.

C. A. SINCLAIR,
H. M. Consul at Foochow.

FOOCHOW, February 28, 1878.

MR. RUSKIN ON COLOR.

THOSE who were interested in Mr. Ruskin's aphorisms on drawing which we printed in our issue for December 1, 1877, will doubtless find of interest the following excerpt, taken as it is, like the former, from the "Laws of Fésole," and printed in the *Architect*.

"In my introductory Oxford lectures you will find it stated that '*all objects appear to the eye merely as masses of color*;' and that shadows are as full in color as lights are, every possible shade being a light to the shades below it, and every possible light a shade to the lights above it, till you come to absolute darkness on one side and to the sun on the other. Therefore, you are to consider all the various pieces either of shaded or lighted color out of which any scene whatsoever is composed, simply as the patches of a harlequin's jacket, of which some are black, some red, some blue, some golden; but of which you are to imitate every one *by the same methods*.

"It is of great importance that you should understand how much this statement implies. In almost all the received codes of art-instruction you will be told that the shadows should be transparent, and lights solid. You will find also, when you begin drawing yourselves, that your shadows, whether laid with lead, chalk, or pencil, will, for the most part, really look like dirt or blotches on the paper, till you cross-hatch or stipple them, so as to give them a look of network, upon which they instantly become more or less like shade, or, as it is called, 'transparent.' And you will find a most powerful and attractive school of art founded on the general principle of laying a literally transparent brown all over the picture for the shade, and striking the lights upon it with opaque white.

"Now the statement I have just made to you implies the falseness of all such theories and methods. Essentially, the use of transparent brown by Rubens (followed by Sir Joshua with asphaltum) ruined the Netherland schools of color, and has rendered a school of color in England hitherto impossible. And I mean to assert that falsity in the most positive manner. Shadows are not more transparent than lights, nor lights than shadows; both are transparent when they express space; both are opaque when they express substance; and both are to be imitated in precisely the same manner, and with the same quality of pigment. The only technical law which is indeed constant, and which requires to be observed with strictness, is precisely that the method *shall* be uniform. You may take a white ground and lay darks on it, leaving the white for lights; or you may take a dark ground, and lay lights on it, leaving the darks for darks; in either case you must go on as you begin, and not introduce the other method where it suits you. A glass painter must make his whole picture transparent, and a fresco painter his whole picture opaque.

"Get, then, this plain principle well infixed in your minds. Here is a crocus — there is the sun; here, a piece of coal — there the hollow of the coal-scuttle it came out of. They are everyone but patches of color, — some yellow, some black, and must be painted in the same manner, with whatever yellow or black paint is handy.

"Suppose it, however, admitted that lights and shades are to be produced in the same manner; we have further to ask, what that manner may best be? You will continually hear artists disputing about grounds, glazings, vehicles, varnishes, transparencies, opacities, oleaginousnesses. All that talk is as idle as the east wind. Get a flat surface that won't crack, — some colored substance that will stick upon it, and remain always of the color it was when you put it on, — and a pig's bristle or two wedged in a stick; and if you can't paint, you are no painter, and had better not talk about the art. The one thing you have to learn, — the one power truly called that of 'painting,' is to lay on any colored substance, whatever its consistence may be (from mortar to ether), *at once*, of the exact tint you want, in the exact form you want, and in the exact quantity you want. *That is* painting.

"Now you are well aware that to play on the violin well requires some practice. Painting is playing on a color-violin, seventy times seven stringed, and inventing your tune as you play it! That is the easy, simple, straightforward business you have to learn. Here is your catgut and your mahogany — better or worse quality of both of course there may be — Cremona tone and so on, to be discussed with due care, in due time. You cannot paint miniature on the sail of a fishing-boat, nor do the fine work with hog's bristles that you can with camel's hair; all these catgut and bristle questions shall have their place, but the primary question of all is — can you *play*?

"Perfectly, you never can, but by birth-gift. The entirely first-rate musicians and painters are born, like Mercury; their words are music, and their touch is gold; sound and color wait on them from their youth; and no practice will ever enable other human creatures to do anything like them. The most favorable conditions, the most docile and apt temper, and the unwearied practice of life, will never enable any painter of merely average human capacity to lay a single touch like Gainsborough, Velasquez, Tintoret, or Luini. But to un-

derstand that, the master must still depend on practice *as well* as on genius, that painting is not one whit less, but more, difficult than playing on an instrument, and that your care as a student, on the whole, is not to be given to the quality of your piano, but of your touch, — this is the great fact which I have to teach you respecting color; this is the root of all excellent doing and perceiving.

"And you will be utterly amazed, when once you begin to feel what color means, to find how many qualities which appear to result from peculiar method and material do indeed depend only on loveliness of execution; and how divine the law of nature is, which has so connected the immortality of beauty with patience of industry, that by precision and rightness of laborious art you may at last literally command the rainbow to stay and forbid the sun to set.

"To-day, then, you are to begin to learn your notes, — to hammer out, steadily, your first five-finger exercises; and as in music you have first to play in time tune, with stubborn firmness, so in color the first thing you have to learn is to lay it flat, and well within limits. You shall have it first within linear limits of extreme simplicity, and you must be content to fill spaces so enclosed, again and again, till you are perfectly sure of your skill up to that elementary point.

"So far, then, of the manner in which you are to lay your color; next comes the more debatable question yet, What kind of color you are thus to lay, sober or bright? For you are likely often to have heard it said that people of taste like subdued or dull colors, and that only vulgar persons like bright ones.

"But I believe you will find the standard of color I am going to give you an extremely safe one, — the morning sky. Love *that* rightly with all your heart and soul and eyes, and you are established in foundation-laws of color. The white, blue, purple, gold, scarlet, and ruby of morning clouds are meant to be entirely delightful to the human creatures whom the 'clouds and light' sustain."

NOTES AND CLIPPINGS.

An Efficient Board of Health. — The Illinois State Board of Health has been in operation one year; has had thirteen meetings in various parts of the State; has issued certificates to 4,950 physicians and midwives, each of which is signed by its seven members; has examined 366 applicants for the license to practice, and rejected 221 of them; has driven 1,200 unqualified practitioners out of the State; has stopped eight colleges from giving two graduating courses in one year; has refused to accept or to recognize the diplomas of eight medical schools; has revoked six certificates for gross unprofessional conduct and advertising; and at its meeting in Decatur, June 27th, authority was given to revoke the certificate of another physician, accused of being an abortionist, in case the facts presented were proven.

Effects of the Sutro Tunnel. — A reduction in the temperature of the 2000-feet level of the Savage mine, from 120 degrees to 94 degrees, since the Sutro tunnel penetrated that mine, is now reported, and the cooling process is still going on. If the air draft through the tunnel into the mines can reduce the temperature 26 degrees in so short a time at a depth of 350 feet below the level of the tunnel, there is a reasonable prospect that it will ultimately have a like good effect upon many other mines put or to be put in communication with the tunnel. Men can work without danger of collapse at a temperature no higher than 94 degrees, and thousands of miners have done good work in the gulches at 110 degrees, but at 120 degrees it is impossible for any man, however strong, to work more than a few minutes without rest. If the Sutro tunnel should bring about a like change in the temperature of the Comstock mines generally with that already realized in the Savage 2000-feet level, it will be the means not only of making mining more profitable, but of saving a very great waste of life and health attendant hitherto upon that kind of labor. — *San Francisco Chronicle.*

The Hudson River Tunnel. — It is announced that within a month work will be resumed on the Hudson River Tunnel. The company having been incorporated in both New York and New Jersey, there are two sets of directors, those on this side of the river representing $7,000,000 of the capital stock and those on the other side $3,000,000. The old company dug a circular well, twenty-five feet in diameter and thirty feet deep, near the workhouse, and walled it with brick three feet thick. The tunnelling will proceed from this well. It is to be facilitated by the application of an air-lock, which will compress the air in a chamber large enough for three men to work in. At one corner of the chamber will be placed a portable funnel, into which dirt and stones will be thrown. The air in the chamber will force the dirt through a long pipe which is to run over the shaft and above the surface of the water to a scow in which it will be carried ashore. With a view of preventing danger from leakage or caving, a brick wall three feet thick, the outer layer of bricks to be chemically prepared to withstand moisture, will be built as fast as the tunnelling proceeds. The grade of the tunnel will be two feet to the hundred, descending from Jersey City; then three feet to the hundred ascending on this side for fifteen hundred feet; and then from that side to the terminus in Washington Square, two feet to the hundred. The top of the tunnel in the centre of the river, where there is a depth of sixty-two feet of water at ebb tide, will be twenty feet below the river-bed. Work will be resumed on the Jersey City side, and will be continued until the tunnel is carried two thirds across the river. This is to facilitate the removal of dirt. Then workmen will be placed on this side, and the work will be completed when the men meet a few rods off the shore. Col. Wm. H. Paine, the engineer, says that it will take two years to complete the work. The directors expect to spend $10,000,000 upon it. The track will be four miles long. — *Mining and Engineering Journal.*

Architectural Diplomas. — M. Davioud, in his paper on Architects and Engineers which obtained the Prix Bordin, does not countenance the establishment of architectural diplomas.

A Trappist Monastery. — A Trappist monk is negotiating for land near Philadelphia on which to build a monastery large enough to contain two hundred monks, who are to be recruited from the Trappist monasteries of Mount Millary in Ireland, Sept-Fonds in France, and Mariastern in Turkey. As these monks number amongst them architects, builders, and craftsmen of all kinds, American mechanics will reap small profit from this new enterprise.

A New Journal. — It is reported that an eight-page, fortnightly journal, named the *Art Interchange*, will shortly be published under the supervision of the Society of Decorative Art of New York.

Clearing Quebec Harbor. — The difficulties in the way of keeping the channels of inland navigation in navigable condition is shown by the operations that have for some time been going on at Quebec. Here one hundred and seventy-five anchors, twenty-four of which were broken, have been recovered by the lifting barge, together with eight thousand fathoms of chain cable. It is thought that as soon as the hulk of the French vessel *D'Original* which was sunk more than a hundred years ago, is either raised or demolished, the river-bed will be once more thoroughly clean.

Threatenings of a Serious Strike. — Just at present Londoners are seeking a solution to the old question, *Quis custodiet custodes?* for there seems to be imminent a strike which will cause even more passing inconvenience than did the strike of the Parisian *cochers* which has just ended. The Metropolitan police has as a body become discontented, and a spirit is manifesting itself among them which closely approaches mutiny. The cause of complaint is the low rate of their pay, which is for a first-class constable thirty shillings a week! ($6.75), certainly a very small sum to pay a man who may at any moment be called on to risk his life as a matter of everyday duty. The matter is a peculiarly delicate one, and unfortunately the authorities seem indisposed to meet the issue fairly, but are trying to put the men off with fair promises. The importance of keeping the police contented will probably prevent the Government from letting things go so far as to allow an actual strike to take place, but the effect of acceding to such a demand on compulsion, even if the demand be a just one, cannot but have a bad effect on the morale not only of the police force but on that of the whole community.

The Hôtel de Ville, Paris. — M. Baltu says that, although the work at the Hôtel de Ville, Paris, is making satisfactory headway, it will probably be ten years before it is finished. He thinks that the exterior stonework may all be laid up by 1880.

The New Harbor for Boulogne. — The *Scientific American* says that one of the last acts of the French Parliament, before separating for the holidays recently, was to vote nearly $3,500,000 for the construction of a new deep sea-harbor for this well-known watering place. The chief feature of this harbor is a solid stone jetty on the southwest 2,295 yards long, a wooden jetty on the northeast 1,570 yards long, and a solid stone breakwater 515 yards long on the outer or western boundary. Between this breakwater and the jetty will be two entrances 272 yards wide, and 183 yards wide. In the middle of the harbor will be a stone jetty, 436 yards long and 218 yards wide, alongside of which steamers may embark and land passengers at all hours of the tide. The new port will have an area of 310 acres, and a depth of water varying from sixteen to twenty-six feet at the lowest spring tides. The new port was projected by M. Alexandre Adam, formerly Mayor of Boulogne and ex-President of the General Council of the Pas-de-Calais. The plans adopted are those of M. Streckler, Chief Engineer of the Ponts-et-Chaussées.

Ventilating Cowls. — Mr. W. P. Buchan, a sanitary engineer of Glasgow, says: —

"As the result of the experiments made at Kew by the judges of the Sanitary Institute with ventilators on against plain pipes is still commanding considerable attention, will you permit me to publish the following results, showing the effect the shape of the outlet has upon the speed of the up-current.

I have recently put up at my house a four-inch pipe about thirteen feet in height, and whose top stands about two feet above the ridge. At eight P. M. last night I tried the up currens, first with the plain pipe, then I put an expanding or trumpet-mouthed outlet perpendicularly upon the top of the pipe. This, being tried, was taken off, and a Boyle's ten-inch soil-pipe ventilator with three-inch pipe attached put on; this being also tried, was taken off in turn, and a three-inch Banner's cowl was then tried, and the following are the results, showing the number of feet per minute which each produced of up-current: —

Plain open pipe.	Pipe with trumpet mouth.	Boyle's.	Banner's.
200	400	300	200
200	300	200	170
200	300	200	160

In this case the plain upright pipe with expanding outlet gave much the best results, and when at four P. M. to-day I repeated the experiments, the trumpet outlet gave much the quickest up-current. The plain pipe again gave 200, but Banner's cowl only 200, 170, and 160. The open joint where cowls turn helps to hurt their effect. Yesterday I tried a drain at Dr. Cassell's house, Newton-terrace, here, which has the soil-pipe going up the centre of the house to act as its ventilating shaft, and which soil-pipe carries off the rain-water from the centre gutter; the anemometer showed an in-current of fresh air into the drain through the ventilating trap of 300 feet per minute, but after running hot water down the soil-pipe the in-current rose to 500 feet.

An Artificial Marble. — It is said that Miss Hosmer has devised a way of making artificial marble. In this process the subject is sculptured in limestone, and is then placed in a boiler filled with pure water in which it is hermetically sealed and fire is applied. When the pressure indicated by a manometer shows an atmospheric pressure of five or six degrees the water is allowed to cool. The sculpture is then withdrawn and treated in colored baths, alum being, we believe, used as the mordant.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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CONTENTS.

SUMMARY: —
The English and German Systems of Architectural Education. — The French System. — The Application of these Systems to our own Conditions. — The Competitions in Interior Decoration. — Engineers vs. Architects. — The International Health Congress at Paris. — Suggestions made by Delegates. — The Mining Débris Question in California. — A Correction 89
MODERN PLUMBING. VIII. 90
THE ILLUSTRATIONS: —
The Vaughan Building, Providence, R. I. — Designs for Cottages. — Designs for Vestibules. — Chapel at Malden, Mass. 92
NOTICE OF THE FIFTH COMPETITION IN INTERIOR DECORATION . 93
ART SCHOOLS IN GERMANY 94
CORRESPONDENCE: —
Letter from New York. 95
COMMUNICATIONS: —
The Rumors of Competition. — Black Mortar 96
NOTES AND CLIPPINGS 96

WE print in another column a portion of a paper in the *Architect*, by Mr. John Sparkes, head master of the National Art Training School, on the Art Schools of Germany. What principally concerns us is the system of instruction pursued in the Academy of Architects at Berlin, and its apparent results. As contrasted with the English system of apprenticeship, whereby a pupil is "articled" for a term of years to some distinguished practitioner, in whose office he gathers such instruction as he may by independent experience and observation of practice, the German method has all the advantage of academical precision in training, with exact scientific instruction in all the branches of construction and æsthetics, including the rigid classification and theory of the styles. It seems to us that this difference of systems explains much of the characteristic difference between the architecture of England and that of Germany, and opens the important question whether architecture as a fine art can really be developed like a science by encouraging exactness of definitions and correctness of archæology, and by establishing a uniform method of observation and analysis. What results from this system of education is apparently a certain quality of "coldness and uncompromising exactness" in modern German architecture, a want of freedom and ease of expression, which seem to be inconsistent with the health and natural development of a contemporaneous style. If this be so, if it is the German scientific spirit thus applied to architectural instruction which confers upon modern design in Germany this character of unimaginative precision, and pedantry, the natural fruits of the English want of system in instruction are the frequent development of individualities in the profession, a freedom from restraint, a picturesqueness which borders upon license, the rapid formation of separate schools following men of decisive character and talents in the profession, sudden and phenomenal changes in style, together with the pursuit of fancies and fashions in design; so that the whole building interests of England, so far as they are presented to us in the professional papers, seem to be engaged in a grand architectural masquerade. In a word, through their several educational systems, Germany seems to have an architectural garment too classic and formal for adaptation to daily use, and England a fine old wardrobe of theatrical properties. In neither case do we behold the development of a distinctive style.

IN FRANCE, on the other hand, by virtue of four continuous centuries of academical discipline confined to classic forms, the classic Renaissance is at home, and in successive eras has adapted itself to the characteristics of the time by natural processes; so that for each reign there is a distinctive style or variation of style, not forced by individuals, but developed by historical conditions. This state of affairs seems to give to architecture its greatest function of furnishing to history a series of permanent and monumental records of the spirit of the epochs. It deprives the art of the picturesqueness which results from the English system of a *personal* architecture, subject more or less to the caprices of fashion, but it encourages refinement of invention in confining it to certain traditionary forms; it educates the eye to a greater degree of sensitiveness; it creates an atmosphere of art by its constant associations with the triumphs of masters working always with the same elements of expression, namely, the four orders of architecture, — elements which are understood by all, and are never "out of fashion;" finally, it seems that this academical system, in making the French architects as a class constant to a style, has made them subordinate to their architecture, and has made their architecture singularly impersonal without detracting from its flexibility and interest.

SUCH historical lessons must be taken to heart by all who are interested in our own architectural expressions. It is evident that for our use neither the German, the English, nor the French systems is such as can be transplanted to our soil with profit, but none of them can safely be neglected in the preparation of our own schemes of architectural education. A vernacular style, more or less sophisticated of course, as we have had frequent occasion to say, doubtless now exists, such as it is. How to develop it into grammatical forms, how to breathe into it the spirit of art, how to free our buildings from the dominion of individual caprice in order that they may the more faithfully illustrate our civilization — a duty which for the most part they do not perform, being, as these pages have often shown, rather fancies of individuals and faint reflections of the English fashions than expressions of the epoch, — these are the questions to be solved by our education in art. We have discovered that there is no virtue in the entire neglect of systems of education, and we can readily see that in establishing systems it is easier to go wrong than to go right. The committee on education in the American Institute of Architects is composed of intelligent men in the profession, but they have of late made no sign. We commend this subject and Mr. Sparkes's report in especial to their earnest consideration.

IT will be noticed that the judges who have had under consideration the designs sent in for our fifth competition have declined to award a first place to any one of them. The drawings, as may be seen, are not without many points of excellence, but, with scarcely an exception, they exhibit an incapacity or an unwillingness on the part of their authors thoroughly to work out the design. There are plenty of good ideas, and these are generally fairly brought out so as to show their merits and to give effect to the drawings, but the absence of intelligent study is obvious to the most casual inspection. Most of the competitors have seemed to imagine that grammatical excellence in design, a conformity, that is to say, to the most ordinary usages of style and to the obvious and universally recognized principles of composition, is too simple and easy, too commonplace in fact, to concern themselves about, and that a clever violation of usage is really the only interesting thing left to them to do. In this respect it is true that they follow a natural tendency of the time in the profession, and that a certain piquancy is sometimes thereby conferred upon design, as speech may gain a certain raciness through bad grammar, bad spelling, mispronunciation, and even slang. But this is not the sort of merit which these competitions are intended to encourage. To say what one has to say in the most striking and effective way practicable, without violating the proprieties of speech, is the way of speaking and writing approved among civilized peoples. Their architecture should follow a similar method. Moreover, the chief merit and chief interest in games of skill depend upon the players' strictly following the rules of the game.

WE had occasion lately to express the belief that, in this country at least, engineers are trusted by the public much more unquestioningly than are architects, and chiefly because engineering successes are more easily appreciated by the practical mind of the American than the artistic effect of a good piece of architectural design. That the English public, or any portion of it, should be similarly affected towards engineers, to the dishonor of architects, is somewhat remarkable in a country where our profession is in good repute, and where, thanks to the many notable buildings both ancient and modern which owe their being to architects, the public is better able to appreciate its achievements. Yet on the 13th ultimo a special meeting of the Northern Architectural Association was held at Newcastle to protest against the action of the town council in employing the borough engineer and his subordinates to design and carry out the projected architectural improvements of the town, which at present involve the expenditure of nearly a million dollars, as they include such buildings as a free library, a fish-market,

the public park buildings, etc.,—buildings of such importance to the town as to warrant making every exertion to secure their proper architectural treatment. The association adopted a resolution regretting the action of the town council and recommending that all public work be put to public competition, as was customary in other large towns in the kingdom.

The meetings of the International Health Congress, which have been held at Paris lately, appear to have had a really international character, for we find that active part in the discussions was taken by delegates from the United States, England, Belgium, Holland, Russia, Austria, Hungary, Sweden, Greece, Spain, Prussia, and even from Egypt and Japan. A striking incident of one of the sessions, where the matter of unwholesome dwellings was under consideration, was the speech made by Mrs. Bovett Sturge, M. D., of London, in which she controverted, as far at least as England is concerned, the conclusion reached in the leading paper upon the subject, that artisans' dwellings in which large numbers of persons are housed must be *ipso facto* unhealthy. Having obtained her degree as doctor of medicine at Paris, Mrs. Sturge was able to express herself with a fluency and correctness equalled by that of only one other English person present. She was able to show that in London, while the average death-rate is twenty-one per thousand, in the model artisans' dwellings, such as the Peabody buildings, which can accommodate ten thousand persons, the average mortality is only seventeen per thousand, while deaths from infectious diseases are in these buildings one third less in number than in other buildings in London. The discouraging statements made by the writers of the paper in question, MM. Trélat and Du Mesnil, may partly be accounted for by facts that came to light during the discussion; as, for instance, the fact that one block-building in Paris, which contains 1,800 working-men, women, and children, is wholly unsupplied with water. This, taken in connection with the statement of M. Durand-Claye, that the night-soil taken from the houses of the working class contains from seven to eight kilograms of nitrogen to the cubic meter, while that taken from the houses of the upper class, where there is a water supply, contains but fifty or sixty grams to the cubic meter, speaks volumes to those who knew what provision is made in French houses of the lower grades in the way of water-closets, — perfectly untrapped chutes leading from the different floors into a hogshead in the cellar, emptied as occasion demands.

The delegates were fertile in suggestions as to what legislative enactments ought to be made to enforce a more general attention to laws of health. One of the most important of these was the suggestion by Mr. Edwin Chadwick, C. B., that in each country should be created a Minister of Public Health with legislative power to provide, and executive power to enforce, such conditions as science shall show to be most conducive to public health. The idea was received with approbation on all sides. M. Du Mesnil desired to have a law passed prohibiting the leasing of a furnished lodging, unless the same had been inspected and approved by sanitary authorities, and prescribing an allowance of fourteen cubic meters space to each bed. As instances of such legislation, Senator Crocq mentioned that in Belgium the communal authorities had power to give what orders they chose as to making a house wholesome, and if the proprietor did not comply with their orders the police closed his house. Mr. Adolph Smith said that an English landlord could be fined twenty pounds for letting, before it had been thoroughly disinfected, a room in which a fever patient had been ill. Finally, at the instance of Mr. Jäger, of Amsterdam, an international association has been formed, with Mr. Edwin Chadwick, C. B., as honorary president, for the purpose of urging upon each government the necessity of compelling the several local governments under its control to supply their several districts with pure drinking water.

The struggle between the miners and the farmers in California does not promise to be quickly decided; nor is it likely that any decision will be accepted till the whole legal ground has been fought over. There is no doubt that the farm lands in the valleys have been seriously injured, even if not so much as has been claimed, and that the damage will increase so long as the miners are allowed to empty into the streams the "tailings" washed down by the present system of hydraulic mining. The Sacramento *Record-Union*, which has argued the case of the farmers with moderation and without hostility to the miners, insists that it is a question of the ruin of the whole Sacramento Valley, and possibly of Suisun Bay and the harbor of San Francisco. However this may be, it has been made clear in the testimony of the Bear River case, to which we alluded a short time ago (*American Architect*, August 24), that the question is a vital one to the farmers. In the interest of the miners it is urged that they have for thirty years had the right of throwing their tailings into the streams, and that this right is part of the title of every mining claim; so that to take it away is to despoil the miners by wholesale, to destroy many millions of property, and to bankrupt whole counties. What the law of the case may be, the courts will decide; but as far as the permanent interests of the State are concerned, it can hardly be doubted that if it has come to a question between the two, agriculture is more important than mining. It is hard to believe that no way can be found of working the mines profitably without sending the tailings down stream, or that if this were the case the mines could be valuable enough to make their preservation a matter of vital importance. But in any case it is likely that another generation will exhaust the mines, and if in the mean while they are allowed to destroy the valleys below them, there will be nothing left worth preserving in the region in question. Under these circumstances few uninterested persons will doubt where the interest of the State lies. To an outsider, moreover, it would seem that in a State where society is still somewhat inchoate, as in California, it was of no small importance to establish clearly the principle that one industry must not be practised in such a way as to destroy another.

A very obvious mistake was allowed to pass uncorrected in a paragraph of last week's summary, where, in speaking of the elevator accident at Chicago, the word "lessor" is used in the last line, although the context clearly demands the word "lessee" in its place.

MODERN PLUMBING. VIII.

WATER CLOSETS. II.

The pan-closet is the variety most extensively used, and there are many varieties, differing in workmanship and the mode of supplying the flushing water rather than in principle. A good pan-closet is strong and reliable; the water will not run out, even if the levers or valves are out of order, and if properly treated it is offensive only when the handle is lifted, instead of all the time, like the average hopper; but all the varieties have the grand defect that they empty their contents not directly down the drain, but into a large receiver, constantly smeared with decomposing filth, the gas from which, past up by the trap on one side and the water in the pan on the other, finds its way through any joint, and rushes out in a volume when the pan is tilted after the closet is used. The inferior kinds have additional faults of their own: in many the pan is so small that the water held in the bowl is not sufficient to prevent the sides from being fouled, and the receiver is so small as barely to afford room for the working of the pan, so that paper and other matters get caught between the edge of the pan and the sides of the receiver; and in all the copper pan is subject to corrosion, which, in a period varying from two weeks to two years, according to the thickness of the metal and the virulence of the gases, eats holes, through which the water leaks out, and leaves the pan dry most of the time. It is not difficult to replace it by a new one, as it is only attached by a mass of solder to the spindle; but the usual practice is to leave it uncared for as long as it will hold a little water while in use, regardless of the streams of the foulest vapor which ascend through and around it as soon as the water has leaked away.

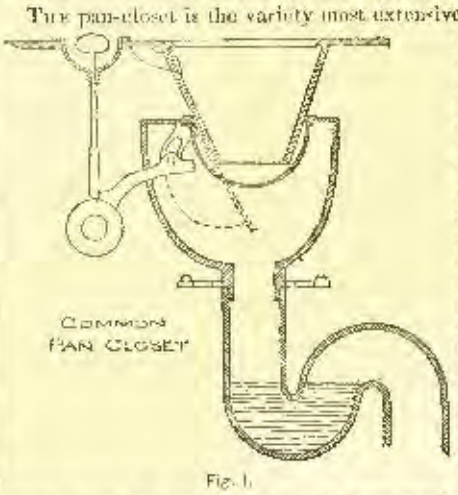


Fig. 1.

The pans would be made more durable by tinning on the bottom instead of only on the inside; but — perhaps because it would be bad for the trade, which finds considerable occupation in replacing worn-out pans — it has never been done until lately, when an English plumber took out a patent for this very obvious improvement.

In this country the most successful attempts to palliate some of the inherent faults of the pan-closet have been made in Boston, where

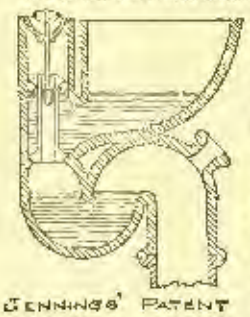
much use is made of receivers enamelled inside, and furnished with a vent at the top, behind the pan, with coupling for a pipe to be carried to a flue, or some better outlet. The receiver is large, so that the pan can work freely and the flushing water splash about in all parts, and the enamelled surface is washed by the water far more perfectly than the rusty iron of ordinary receivers, while the vent precludes any accumulation of gas, and if any draught can be had will prevent the discharge of vapor into the room when the pan is opened. The backward motion of the pan also helps to waft the foul air through the vent. These enamelled pan-closets with ventilated receivers are made by Lennon & Co., Ward, Curley & Co., and occasionally by William Mills & Co., all of Boston. The enamel, not being exposed to the action of hot water, is very durable, remaining perfect after fifteen years' use.

Where a good draught can be obtained, Albee's patent ventilating ring, referred to in treating of hopper-closets, is a useful addition to a pan-closet, answering some purposes for which the vent from the receiver alone is not sufficient. The supply should always be from a detached cistern, rather than by the common method of direct-acting valves.

Thus improved, with enamelled and ventilated receiver, ventilated trap, and cistern supply, a well-made pan-closet is easily managed and kept in order, and is comparatively inoffensive; for these reasons it is still, perhaps, the best apparatus for average use. The plunger-closets, or the Defiance valve-closet, give more perfect cleanliness, with equal or greater durability, but they demand more care, both in fitting up and in use, and the best hoppers with automatic supply, although superior both in simplicity and in effectiveness to any pan-closet, require too great an expenditure of water for ordinary cases.

Where water is tolerably abundant, and the owner can exercise a little patience under the difficulties which often attend their first introduction, and a little care subsequently, no apparatus, unless the valve-closets of the Defiance class, can compare in cleanliness, durability, and efficiency with the plunger-closets, of which the well-known Jennings patent is one of the best examples.

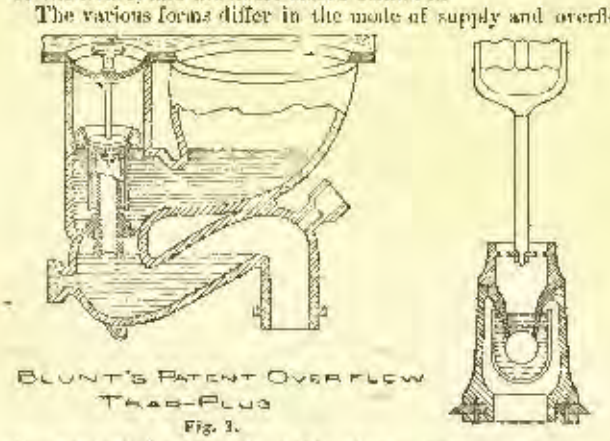
All these consist essentially of a basin without pan or other moving parts, the outlet of which, descending first obliquely and then vertically, is closed by a plunger or plug. On lifting the plunger, which fits closely to its seat, the contents of the basin escape below it into the soil pipe, either directly or through a trap, and the plunger closes the outlet again. There is no harboring of filth in a receiver, as in the pan-closets, to give off fumes into the room in volumes when the handle is lifted, and more slowly at all times around the journals or through the holes in leaky pans, and the water held in the basin by the plunger prevents the fouling of its sides, which is inevitable with a hopper-closet; so that in their use the sanitarian's ideal mode of disposal of refuse is attained, all the filth being "cast instantly out of the house, and the doors closed behind it."



JENNINGS' PATENT

Fig. 2.

The various forms differ in the mode of supply and overflow. In the original Jennings closet the plunger is hollow, and as the water from the supply-pipe rises in the basin it rises also in the chamber in which the plunger works, which communicates with the basin, until it reaches the top of the plug, through which it overflows directly into the trap, as shown in the figure. The obvious defect of this arrangement is that any gas which may return through the trap ascends immediately through the hollow plug and escapes around the handle into the room, and several modes of avoiding this imperfection are in use. In the simplest of these, Blunt's siphon overflow plug, made by the Nason Manufacturing Company, New York, the original plunger is replaced by one somewhat similar, but having the upper orifice covered by a deep inverted cup, which forms a bell-trap in the water of the plunger chamber. D. P. Bower & Co., of Cleveland, Ohio, have also adapted their admirable rubber-ball trap to closing the bottom of the hollow plug, forming a plunger which leaves nothing to be desired. Either of these can be substituted in a few moments for the ordinary plunger, and at small expense give great additional security.



BLUNT'S PATENT OVERFLOW TRAP-PLUG

Fig. 3.

THE BOWER PATENT-PLUNGER

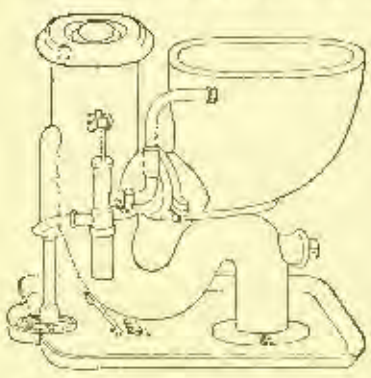
Fig. 4.

Besides these devices for improving the original Jennings closet, the managers of the Jennings Sanitary Depot in New York have introduced modified forms, in which the plunger is solid, and the overflow takes place through a tube connected to the side of the plunger-chamber at the proper height and to the soil-pipe below, with an independent trap at the bottom. This is the arrangement in their Safe-Pan Closet and Trapless Closet, described below.

The supply to the original Jennings apparatus is automatic: the lifting of the handle only raises the plunger to let the contents of the basin and plunger-chamber escape, but a float, consisting of a hollow rubber ring, rests on the water in the plunger-chamber, and as this runs out the float descends, thereby opening a valve connected with the float by a lever. This valve consists in substance of a rubber diaphragm, to both sides of which the water is admitted from the service-pipe, on the top by a small tube and at the bottom by a large tube, the pressure, however, being by hydrostatic law the same on each side, so long as both tubes are open, so that the diaphragm is balanced. The sinking of the lever closes the small tube, and the pressure being thus cut off above, the pressure below pushes up the diaphragm and thereby opens a passage through which it flows into the basin until the float rises again and restores the equilibrium by opening the upper tube.

This mechanism is very delicate. If the diaphragm is too stiff, the pressure will not raise it, and no water will flow; if too weak, the pressure when the valve is opened will burst it, and spoil the valve; so that diaphragms should be selected by the manufacturers to suit the pressure for each case, which they are always willing to do. Even with this precaution, however, the pressure in city water-works is often so variable that it is impossible to get a diaphragm which will not give trouble occasionally if connected directly with the street service. This can be remedied by supplying the closet through the intervention of a service-cistern or tank, which gives a head of water which remains always constant, and allows the diaphragm to be properly adjusted; or a new brass valve may be used, which is sold at the Jennings depot in New York, and works by the same float as the old valve, but does not depend upon a diaphragm, and is consequently more reliable.

Several varieties of the Jennings closet are made, of which the most expensive is the earliest form, all of earthenware, with closet and trap in one piece, the hollow plunger, and the diaphragm valve. An extra outlay of a few dollars is advisable for a Bower patent or Blunt siphon plunger, to put in place of the hollow plunger which comes with the closet. Next to this comes the same pattern, also with diaphragm valve and hollow plunger, but with an iron trap bolted to the earthenware basin and the joint made tight with cement. This costs less than the first form, and should also have the hollow plunger replaced. Next in price is a very convenient and excellent form, called the Jennings Safe-Pan Closet, with earthenware basin and iron trap and the new brass valve; and in addition a galvanized-iron safe-pan under the whole, with trapped outlet, an independent overflow from the plunger-chamber connected with the trap of the safe-pan, and a solid plunger. This, with all its advantages, costs less than the older forms. Still another form, called the Jennings Trapless Closet, has the independently trapped overflow and solid plunger of the last, but omits the trap under the bowl altogether, the necessity for it being supposed to be obviated by the complete closing of the outlet by the solid plunger, and the independent trap in the overflow. This has the new brass valve, and costs less than any of the others. But if the soil-pipe is not thoroughly ventilated, gas may come up through this closet when the plunger is raised, in spite of the opposing influence of the descending current of water, or if some obstruction should get under the plunger so as to hold it open, and therefore the protection of the trap should not be hastily abandoned.



—THE JENNINGS PATENT— —WITH SAFE-PAN—

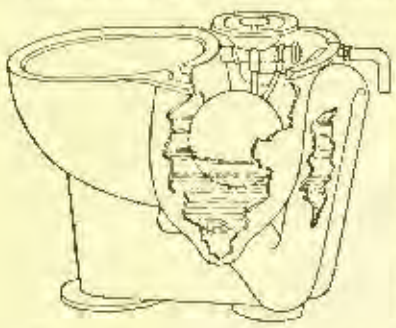
Fig. 5.

The Jennings Closet, as well as all the other closets with side outlet and plunger, is peculiarly liable to give trouble by catching grains of sand, pieces of paper, or, when the work is new, lead filings, between the plunger and its seat, which prevent the plug from fitting tightly, and allow the water to escape from the basin. Unlike the Defiance or the Bramah Closet, which when emptied by defective closing of the valve remain empty, the automatic supply of the plunger-closets comes into action as soon as the water begins to escape, and keeps a constant stream running through, thus causing a considerable waste of water, which most persons do not know how to prevent.

This may be guarded against, if the water is liable to impurities, by inserting in the pipe which supplies the closet a filter of brass wire gauze with a piece of flannel or bit of sponge, which can be fixed into an ordinary coupling, and when in use the handle should always be held up for several seconds, so that all impurity may be well washed out. When this becomes habitual, there is not much danger of leakage from this cause; but if it should occur, the bottom of the plunger and its seat can be easily reached through the basin by the hand, and the obstruction brushed away. Even without leakage, the consumption of water with the plunger-closets is rather large, as the basin holds a considerable quantity of water, and the plunger-chamber has to be filled at the same time with the basin; but the Jennings is perhaps, on account of the comparatively small size of the plunger-chamber, less wasteful of water than the other kinds.

There are two other forms of plunger-closets, which, instead of the delicate valve and float of the Jennings closets, use a ball-cock, working in a chamber attached to the bowl, like the Jennings, but much larger as the ball-cock requires a certain length of lever.

One of these, the Pearson closet, is an English pattern, but can be had of dealers in this country. The plunger is solid, and the overflow consists of a pipe carried from the bottom of the plunger-chamber in S-shape up to the level at which the water is to stand, and then down into the outlet pipe from the bowl. This traps the overflow effectually, but there is no trap under the bowl, the sole dependence for keeping gas out of the room being the tight fitting of the plunger. The basin, plunger cistern, and overflow pipe are in one piece of white earthenware. The ball-cock is much more reliable than a valve, and the whole forms a simple and neat apparatus, which with the addition of a trap would be safe in use, but is much more expensive than the Jennings closets, and consumes more water.



—The Pearson Patent—
—Twin-Basin—
Fig. 6.

Zane's closet, made by Joseph Zane & Co., Boston, is also trapless, and the ball-cock through which it is supplied works in a tank of considerable capacity. The plunger is solid, and the overflow consists of a little hopper at the proper height, closed by a pan, working in a receiver connected to the waste pipe like a miniature pan-closet. The pan, however, is counterbalanced, so that when the water runs in and fills it the weight tips it down, and when the flow stops it returns to its place, retaining water enough to trap the orifice of the little hopper. This is ingenious, but it would dry out in a few hours if the closet were left unused; and when the pan is tipped down and the water is overflowing there is nothing to prevent the ascent of gas but the attraction of the water running in the opposite direction, which is of little effect. This closet, like the preceding, is simple, but the overflow cannot be considered properly protected, and the consumption of water is enormous.

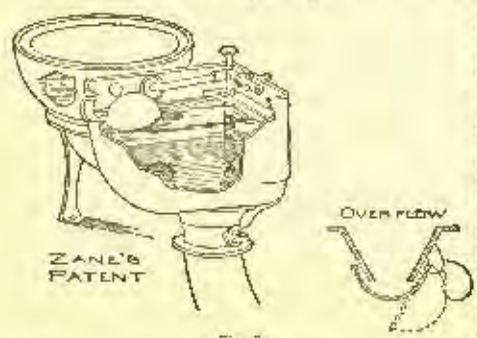


Fig. 7.

A better apparatus than either of these, and one which rivals the Jennings closet, is Demarest's Patent, made by the J. L. Mott Iron Works, New York. This is made only with iron plunger-chamber, which can be had enamelled inside, and the basin can be had either of earthenware or of enamelled iron. The trap forms the support of the basin, as in the Jennings closet; the plunger is hollow, and the overflow takes place through it, but the top is closed, and the water enters the plunger at the side, and has to rise to the top of a partition within it before overflowing, forming a water seal of the height of the partition. The supply is through a valve, adapted to any pressure, worked by a lever and ball; like a small ball-cock but not so simple. The consumption of water is about the same as with the Jennings closet, and the prices are nearly the same. Three qualities are made, (1.) with painted valve section and enamelled iron bowl, (2.) the same with porcelain bowl, and (3.) enamelled valve section and porcelain bowl.

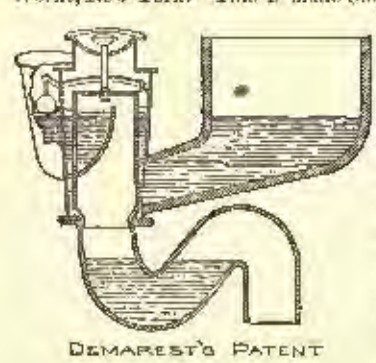


Fig. 8.

It is often convenient, in substituting these closets for an old pan or hopper closet, to set the new one into the trap which has served for the old closet, and for this purpose the Demarest closets are also made without the trap, but instead of it a horizontal offset is turned down at the end at the proper point to enter the mouth of the old trap, usually under the centre of the bowl, with flange for securing to the floor. This saves considerable trouble in making the change.

In adopting plunger-closets, it must be remembered that the large quantity of water they discharge is very likely to siphon out the trap, unless it is ventilated. The Jennings closets have formed on the trap a vent-hole, to connect with a pipe carried to the outer air, or into an open flue, which is the only sure protection. The Demarest closet has the bend of the trap flattened, on the supposition that by thus reducing the capacity of the trap below that of the waste-pipe beyond, it will be impossible for water to pass through it fast enough to fill the bore of the waste-pipe and thus cause a vacuum, a theory which may easily fail if the pitch of the waste-pipe is slight, or if its bore should be contracted by some temporary obstruction; so that in using them it is best to drill the trap and insert a brass nipple for connecting a ventilating pipe; and in all cases where a plunger-closet is set over an ordinary trap, a ventilating pipe should be connected.

Any of the plunger-closets may be, and the Jennings often is, supplied from a service-cistern, with lever, cranks, cistern-valve, and service-box, like that commonly used over pan-closets, but with a larger service-box, thus doing away with the floats and valves of the usual automatic supply. This is a different thing from the cistern placed over the closet only to equalize the pressure on the valve of the automatic supply, and has certain disadvantages, although its simplicity and freedom from leakage make it occasionally useful. With the float-valve, if water escapes from the basin under the plunger, a fresh supply immediately runs in, so that the basin remains full as long as any water is left in the pipes; but with a service-cistern if the basin is emptied, no more water flows in until the handle is pulled. If the outlet is trapped there is no danger to be apprehended, even if a slight leakage should drain the basin dry as soon as it is filled after use, and it may remain dry indefinitely without any further harm than the trouble of refilling it by pulling the handle before use as well as after; but this small inconvenience may be preferable to the loss of water occasioned by even a slight leakage with the automatic supply.

Water-closets with valves should have safes of sheet-lead under them, as the valves are very liable to leakage; and as most closets serve also for slops, the seat should be hinged, as well as the cover, and three-pound sheet lead put on beneath, turned up at the sides, and turned down into the bowl, to prevent the wood-work from getting saturated. The J. L. Mott Iron Works of New York make an enamelled iron slop-safe, fitted either to the Demarest or to the common closet bowls. It is not costly, and is much neater than the lead.

Two common shapes of closet basins are used: the oval bowl, which has an inlet normal to the curve of the bowl, and requires a fan to spread the water over the sides, and the French pattern, which has a side inlet, like an ordinary hopper, to direct the water spirally down the basin. The oval bowl and fan can be better adjusted, and are perhaps preferable to the other.

In setting a pan-closet over a trap the lead trap is placed between the floor beams, the mouth projecting half an inch to an inch above the floor. The lead is then enlarged and beaten down flat upon the floor, the mouth of the closet inserted, and the expanded ring of lead is covered by the flange cast just above the mouth of the closet, which is screwed down to the floor. Putty is spread between the flange and the lead, and a mass of putty is put over the joint after the flange is screwed down.

The best plumbers, before setting the lead trap, reinforce it by scraping the bottom and wiping on a mass of solder outside of it, so as to make the metal at that point half an inch thick or more, in order to protect it against the efforts of amateur sanitarians, who, when there is any trouble with the closet, generally try to remedy it by punching a stick down the trap. The trap should always be connected to the branch of the soil pipe by a brass ferrule, soldered to the lead and caulked into the iron pipe. Nothing short of this will make a proper joint.

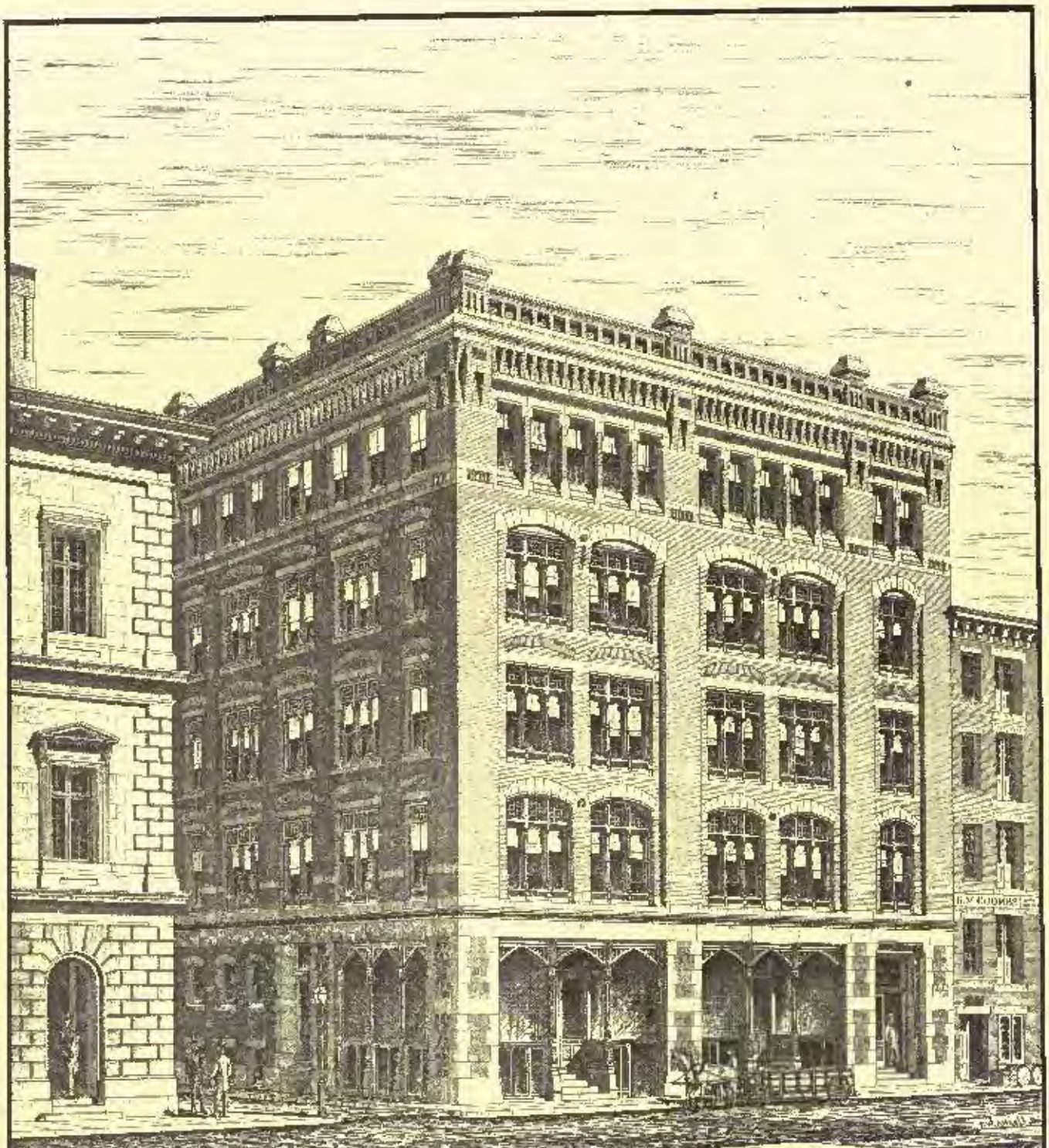
To connect the earthenware arm of a pan-closet or hopper-basin to the supply-pipe, putty seems to be the only resource. A mass of it is put on and tied up with a cloth and strings, and red lead should be mixed with it, as well as with that put over the junction with the trap, to prevent rats from eating it.

The plunger-closets have a copper tube cemented into the basin, with a coupling for attaching the supply-pipe, which is much better than the putty joint.

THE ILLUSTRATIONS.

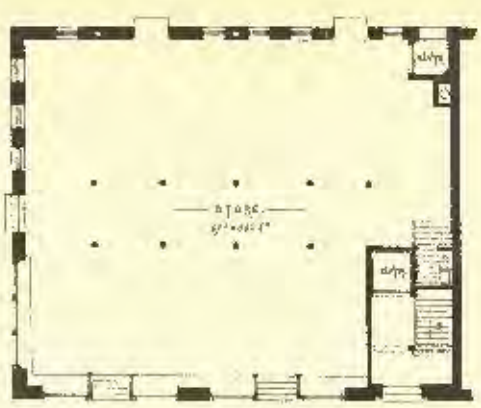
THE VAUGHAN BUILDING, PROVIDENCE, R. I. MESSRS. WALKER AND GOULD, ARCHITECTS, PROVIDENCE.

This building (the exterior of which is nearly completed) is being built for Mr. B. F. Vaughan, and occupies the site of one destroyed

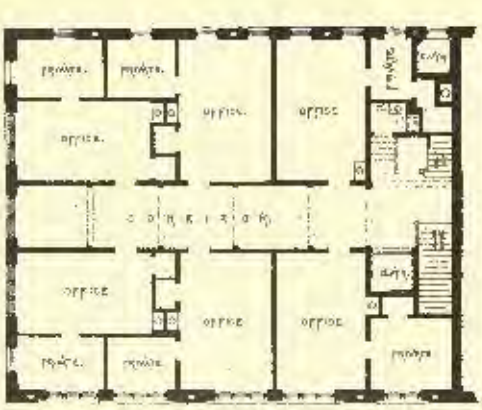


VAUGHAN · BUILDING · PROVIDENCE · R·I

WM. R. WALKER, THOS. J. GOULD, ARCHITECTS.



FIRST FLOOR



SECOND FLOOR

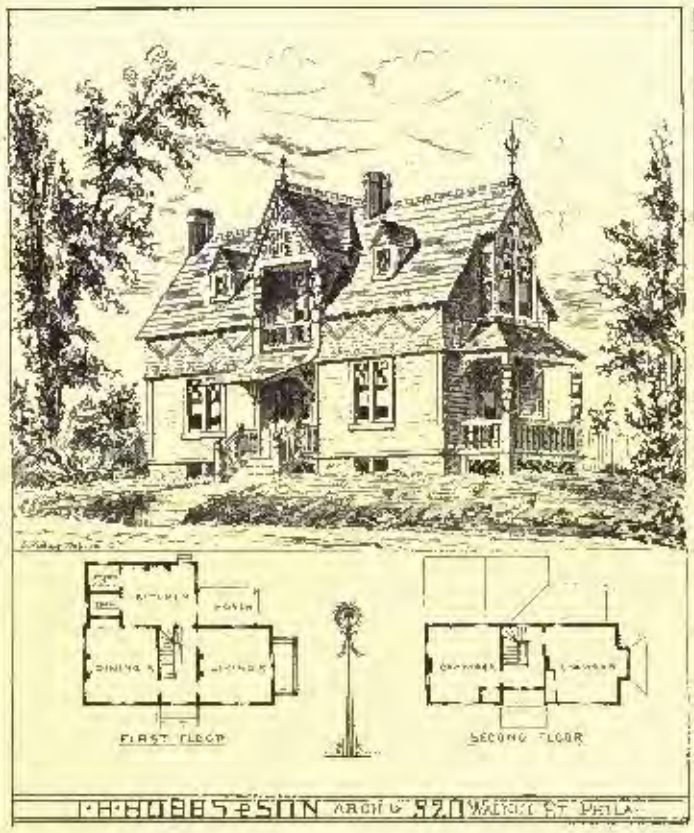
THE HERALD PRINTING CO. 220 DEVONSHIRE ST. BOSTON.

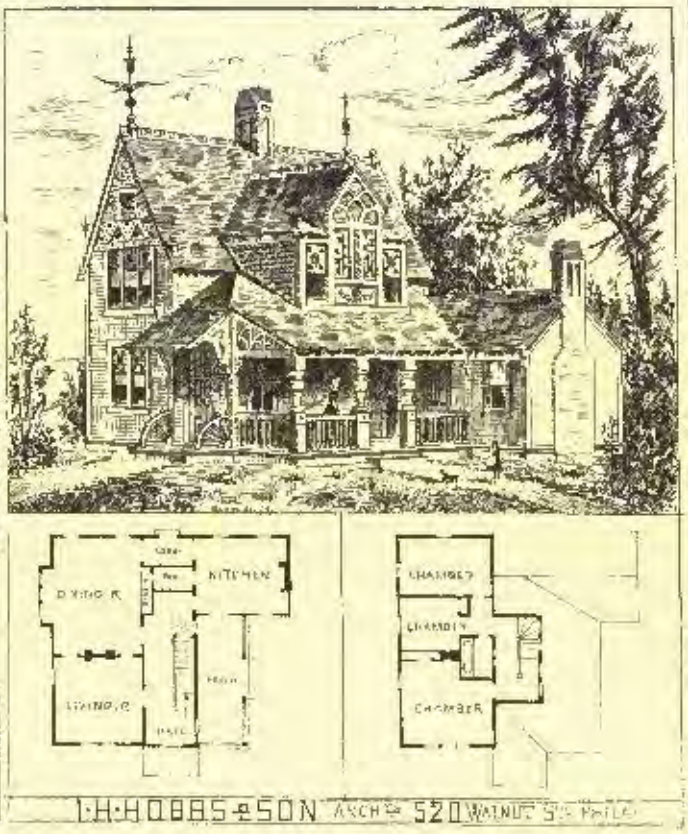
— COMPETITION IN INTERIOR DECORATION —

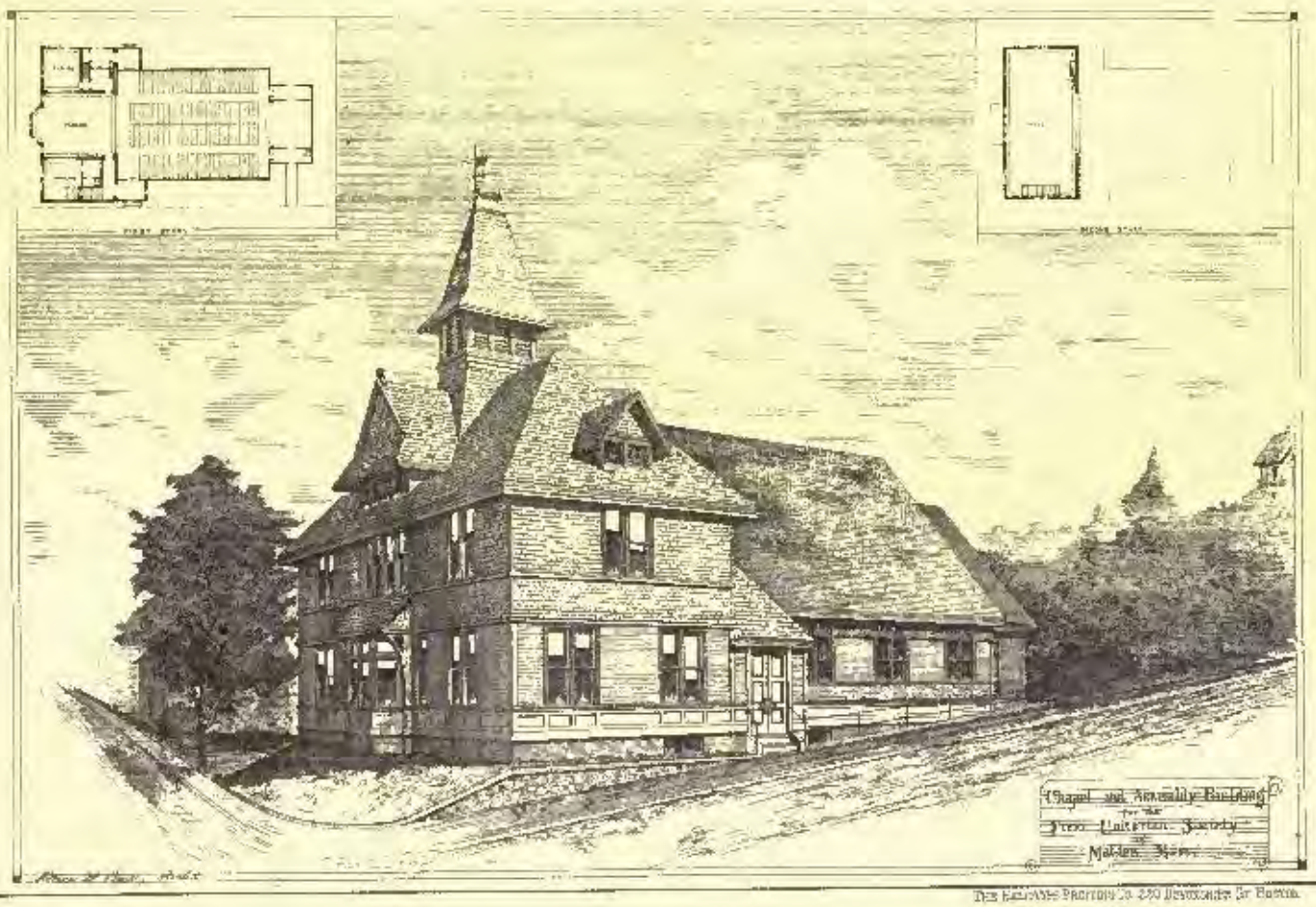
— NEW DESIGNS FOR A VESTIBULE —

— Competition in Interior Decoration. —

— New Designs for a Vestibule —







THE HELIOTYPE PRINTING CO. 220 DEVONSHIRE ST BOSTON.

by the fire of September 27, 1877. The fronts are of dark Philadelphia pressed brick, laid in black mortar, with finish of brown stone from Belleville, New Jersey. The piers of the first story are of brown stone, with quoins and bond-stones of granite. The store fronts are of iron. Moulded brick is used in the frieze and panels of the cornice, and brown brick in the relieving arches. The building has two elevators (freight and passenger), and is to be heated by steam. The finish of the corridors and offices is to be of ash. The transom lights of the windows are to be filled with lead sashes glazed with small squares of straw-colored cathedral glass.

DESIGNS FOR COTTAGES. MESSRS. J. H. HOBBS AND SON, ARCHITECTS, PHILADELPHIA.

DESIGNS FOR THE INTERIOR OF A VESTIBULE, — COMPETITION NO. V.

The members of the jury have thought it best not to award a prize to any of the designs submitted to their inspection. They consider, however, that the designs by "*Hero*," "*Sub umbra in umbra*," "*Nemo*," and "*Echinus*," are worthy of honorable mention. See Summary and the following article.

CHAPEL AT MALDEN, MASS. MR. F. A. BURR, ARCHITECT.

NOTICE OF THE FIFTH COMPETITION IN INTERIOR DECORATION.

THE programme of this competition, as printed in the *American Architect and Building News* of July 6, is as follows: — "The subject of the fifth competition will be the interior of the entrance-vestibule of a city house. In plan it will be ten feet by twelve, and it will be fourteen feet high. By day it is to be well lighted by transom or side-lights; and as it must be lighted at night, special attention must be paid to the chandelier, gas-brackets, or other attributes of artificial lighting. Required: A plan showing the arrangement of coat-closets, and the design of the floor-tiling; an elevation looking towards the street, a section, and details to a larger scale. Or instead of this, a plan, a perspective view of the interior and details, will be accepted."

Twelve competitive designs have been submitted under this programme, and their relative merits naturally largely depend upon the manner in which the formidable difficulty of the great height of the vestibule, as compared with its width and breadth, has been encountered and solved. The other conditions are more commonplace, and the competitors have met them with ingenuity and knowledge in various degrees of excellence.

"*Comus*," "*Sub umbra in umbra*," "*Nemo*," "*Echinus*," and "*Night*," each in a different way, have recognized the main point of design in the problem, and, all other things being equal, their rank in the competition should depend upon the character of the architectural devices engendered and developed by such recognition.

"*Comus*," in a drawing rendered with decision and force, gives us a free Renaissance design, excuses the height of the small vestibule as compared with its area by opening it into the house with a screen of arches, — a wide and narrow one side by side, — bold in its absence of symmetry, but wanting in essential relations with the rest of the composition. The columns and pilasters of this screen are not equal in height to those which decorate the walls of the vestibule, and the important line which separates the attic from the order in the sides of the vestibule is not recognized on the side occupied by the screen. Moreover, although the ceiling is not shown in plan, the perspective suggests four beams crossing from the two pilasters on each side, but, the two pilasters being wanting on the screen side, the relation of the beams to the screen becomes entirely accidental, and the unity of the design is interrupted in this respect also, — a fatal defect, not countenanced by the *bravura* style of execution, which is effective and imposing, and by the detail, which shows experience and training. The gas pendant is ingenious and has more than the elements of good design.

"*Sub umbra in umbra*" also has an open screen defying conventionalities of symmetry, but it is square at the top and treated with quarries of glass above a transom thus opening the vestibule into the house more completely than "*Comus*," and enabling him the better to dispense with an attic, or broad frieze or great cove, devices which all the rest of the competitors (with the possible exception of "*A Seeker*") have employed to lessen the effect of height. He employs no horizontal wall features except a dado, thus giving to the vestibule rather the treatment of a habitable apartment than an architectural compromise between the formality of the exterior façade and the freedom and comfort of the interior. In this respect we consider that he has lost an opportunity in his design. But what he has attempted has been carried out with a confidence and a certain audacity which command respect, although we do not like to see the essential conditions of style and design violated even by such a dashing character of drawing as both "*Comus*" and the present competitor have seen fit to adopt. The interior treatment of the outside door and the window alongside has ingenuity and some good details, and the decorated panels over the transoms, apparently filled with designs upon light tiles, though eccentric in form over the door, are allowable expedients of decoration. The treatment of the deep reveals is not explained in the perspective, which in this respect does not conform to the plan. The Roman mosaic in the floor does not suggest a proper contrast of lines in treatment of borders and centre, and is too archaic in design, — in other words, the design does not justify the cost. The ceiling ribs are of similar design in vestibule and hall; but they have no relation whatever with the walls. The discrepancy is apparently capricious, and this is an offence in architecture. The subordinate rooms are well arranged.

"*Nemo's*" is a more practicable and less eccentric composition than the others. The four walls and the ceiling "hang together" well. The place is well lighted, and the detail temperate and well composed. Opposite the door is a glass screen similar in treatment to the entrance wall, and there is an outer and inner door between the vestibule and the street. The walls are harmoniously divided into dado, screen, and frieze, the dado, frieze, and ceiling being of oak and the screen of plaster, without any surface ornament and presumably treated with a plain dark tint. There are also a chimney-piece and a settle on the opposite sides, but entirely out of scale with the architectural features of the cornice. This arrangement, combined with the absence of vertical pilasters on the sides and the extension of the whole by the glazed screen into the hall beyond, satisfactorily meets and conquers the difficulty of height in a small space. But for all this the design fails to interest because the *motif* of it has become commonplace.

"*Echinus*" divides his wall space into four parts by an order resting on a dado and supporting an entablature of bold projection; above this are a flat wall-space and another entablature with a broad frieze and a cornice introducing the ceiling. The first entablature is an impost to the full arch with its fan-light over the door. The plan has indications of an open screen separating vestibule from hall, but its treatment in connection with the architectural features above noted is not easy to explain and is not attempted. The main *motif* is correct. It is not a bad idea to emphasize the projection of the impost so as more effectually to separate the upper part of the narrow vestibule from the lower, thus concealing a part of the wall-space above, and decreasing the apparent height. But this impost, which is a full entablature, should not be so entirely disproportionate in height to the pilasters which support it, — a disproportion fatally increased by the device of engaging light colonnettes on the faces of the pilasters, thus causing the heavy entablature to overhang the pilasters and rest its weight upon the colonnettes, the bases of which, by the bye, are, unhappily, in the form of delicate vases, quite unfitted for the function of bearing weight. The figure decorating the key of the arch and holding the ends of the garlands, which are festooned along the upper frieze, is a modern French device of the Second Empire, out of scale with the rest of the design, and far too light to do the work of supporting the cornice, which is cruelly blocked up upon her head. A master, however, at the elbow of "*Echinus*" could easily have told him how to make the idea of this design more correct and academic, and this with only a few slight changes of proportion. The orders, except in the hands of a skilled workman, are dangerous things to take liberties with.

"*Night*" has attempted to solve the problem of height with a great coved ceiling, which is almost in the form of a dome. This is an excellent architectural expedient, and the walls support it in good academical Gothic fashion; everything, front doors, vestibule doors, closet doors, in width and height, falls into place by itself, as it were, and the skeleton of the composition is quite correct. The detail, however, is bald and wants study; the outside door especially being distinguished by a lamentable absence of thoughtful design; also the decorations of the wall-panels do not decorate; they are rather Egyptian than Gothic, and as such are inconsistent and out of keeping. The carved caps of the octagonal piers should have coincided with the height of the frieze; then, accepting his "dark cherry" for the wood-work and his "dull yellow bronze" color for the walls, the frieze might have been in dark olive green and the dome in warm tones with black outlines upon a gold ground. This would have made a combination of color and form sufficiently deep and serious in effect not to prejudice the eye and render it unfit to enjoy the domestic brightness within. The "crimson on gold," as proposed in the scheme for the dome, would have made sad discord with the cherry.

"*Hero*" gives us a fine line drawing, very carefully executed, the free-hand parts having a little tendency to scratchiness; but the main lines of the composition are simple, and the details conscientiously and laboriously studied. Eight pilasters, equally spaced from the corners, carry four flat ceiling-beams adjusted to a coved cornice. Under the cove is a broad frieze of five square panels on the long sides and four on the short sides, those over the entrance door being filled with stained glass. The doors are well designed and the principal panels are filled with various woods glued together diagonally and carved in low relief; a capricious fancy. The details, if not actually the best presented by any of the competitors, are the most carefully and delicately composed. A more vigorous drawing and a coarser scale with a more marked accentuation of lights and darks would have presented them more acceptably and done greater credit to the good qualities of the design. As a whole it is refined and happily free from eccentricities, and exhibits moreover not a little unity of composition. But the detail is too fine and too delicate for the space and the place, and promises more than can be fulfilled in the apartments to which this is really the vestibule. As regards material and color, the wood-work is oak and black walnut, the wall colors are in russet and brown, the frieze and ceiling in warm grays, with fine de-

tails of gold and black,—all excellent for my lady's boudoir, but a little out of place where her footmen wait. The gas pendant and the floor tiling are also designed in an intelligent and painstaking manner.

"*Alpha*" presents his scheme in a perspective showing abundance of light with panelled wainscoting, a frieze above treated with balusters, and a simple coffered ceiling supported by brackets, all very cleverly arranged for a long hall, but not adapted to the small space allotted, which space his treatment of plan has made smaller still, the floor and ceiling being only 10′ × 7′. One does not naturally look up in such a hall, and therefore an architectural arrangement which does not correct the disproportion and apparently bring down the ceiling is not adapted to the conditions. Moreover, the design suggests the entrance of a country house rather than of a city house. One difficulty of inordinate height he has to a certain extent remedied by suggesting that the treatment here is extended into the hall beyond, but this is only a partial extenuation for a fundamental oversight in design. But unlike the designs of most of his competitors, this looks like a vestibule hall, and, except for the defect of height not being remedied, is worthy of high rank. The detail is sensible and simple. The sketch of the exterior, although showing a porch wanting in some of the essentials of architectural character, notably in respect to the pilasters, which are badly composed, gives a reason for the lower ceiling over the entrance end of the vestibule and explains but does not excuse the double frieze. The treatment of the gas-fixture is bad. Nevertheless "*Alpha*" makes an excellent contribution and is a dangerous competitor.

"*A Seeker*" gives us a monumental Gothic design in stone, of fair detail but with a greater predominance of vertical over horizontal lines than elsewhere occurs, thus failing to recognize and provide for the main difficulty as regards height. A panelled wooden dado improperly covers the stone-work, the weaker being used to protect the stronger material. There is an outside door in two folds, constructed with carpenter's panellings and only 3′ 8″ wide between jambs.

There is another monumental vestibule signed "*A. M. Arch. Assoc. 20.*" without scale to the plan, and conceived in classic forms not well understood. It is a long entrance-hall divided into bays on the long side by engaged Doric columns with *round* abaci, and divided by two open screens of the same order; the outers crown, which is removed from the doorway only by the width of one narrow bay, has apparently no *raison d'être* except perhaps partially to cover the two open recesses on either side of the porch, which are used as closets. The conception and detail are crude and the absence of invention is not palliated by academical correctness. The tiling is a contused mosaic of small geometrical forms not decorative in character. If the author of this design will study that of "*Alpha*," he will learn how an effect equally simple, but far more correct and domestic, is to be obtained by the use of the same order properly carried out.

"*D. P. P.'s*" composition is not necessarily a vestibule, judging from its treatment, but rather a small room of unusual height. It is not sufficiently architectural to meet the conditions, and is wanting in boldness and invention. The caprice of the broken panelling is too often repeated and fatigues the eye; and the apartment has not sufficient light. The study of color in the tiling does not assist its general geometrical idea.

"*Walpurgis*" presents us with the outside as well as the inside of the front door, and the former takes unwarrantable liberties with the architectural alphabet, giving us coupled, stunted, engaged mediæval shafts to support a pedimental form of debased classic. The vestibule has no architectural character and presents but little to criticise. The panelling of the door, however, is considered with some care, but it is not well composed, and is crude and capricious in its ornament.

Finally one who signs himself with indescribable hieroglyphics offers a design which is not architectural, although it is not wanting in indications of a certain inventive faculty; thus there are several curious mechanical devices set forth with painful minuteness, such as a revolving coat closet, an ornamental box for a certain spring, a gas-bracket combined with a bell-pull, decorated with purple cloth and supporting a naked creature on a trapeze. The constructive and decorative forms we do not understand and will not attempt to describe. We would remind this competitor that our business is with architecture, which is a serious matter, and if he proposes to compete he must observe some of the conditions of design. If a man would write a sonnet he must use the language of civilized people. To invent a new language, as this hieroglyphist attempts, is painful and ridiculous.

ART SCHOOLS IN GERMANY.[1]

THE GEWERBE SCHULE IN BERLIN.

The Gewerbe Museum, under Director Grunow, is a large institution which was instituted but a few years ago by private enterprise, on the plan and after the example of the Museum of South Kensington. It is now practically supported by a grant from the government. The museum is arranged for the use of the students and others who are working at any special industrial subject; that is to say, it has no regard to chronology or geography, but is planned so that all the glass, or wood carving, or enamels, or of whatever other class the objects may be, are placed together, the technical craft being the basis of the arrangement. Schools under the management of Director Ernest Ewald, of considerable size and importance, have now grown around this central museum, and the directors are anxious to establish branch or district schools in various parts of Berlin, as affiliated classes, all to work with the main aim of improving the taste and handicraft of the artisans engaged in art industries, but at the same time to educate any other persons who may submit to the training. These schools are mixed, that is, both men and women work together in the same class-rooms; this is somewhat unusual in Germany.

There are six hundred students, and fifteen professors; ten per cent of the whole number are free students, the rest pay about six shillings per month, and to some a money scholarship is granted to enable them to develop their gifts, and to allow them to study by day at original composition in design. The elementary classes draw from the large copies in Jacobsthal's "Grammatik der Ornamente" the full size of the originals. A few of these copies are tinted with two or three flat washes; these are copied by the students in sepia or indigo, or other simple tint, with the view of giving them dexterity in the laying on of flat tints exactly in the right place. A large number of Greek frets are among the copies above mentioned; these are used for the same purpose and answer well, inasmuch as the various changes of direction of the forms in which the tints are to be placed give ample exercise to the student to combat difficulties in flat washing. Precision of touch and entire absence of retouching, stippling, or repairing are insisted on.

The application of this practice to higher work is made when the student imitates the cast in light and shade in tempera; the benefit of exact thoughtful imitation of tints is then seen. The outfit of the student consists of a small wooden box in which are six pots of mixed color, gradnated in tone from the lightest to the darkest tint that will be needed to imitate the cast. This color is used on a palette, and the work proceeds step by step from beginning to end in the most straightforward manner. It is an excellent exercise, and one that it would be well to encourage in our schools. Its advantages are those that belong to distemper painting. They are valuable in giving exactness in the estimate of tones and gradations; in the directness of the work itself, as each tint is put down in its right place at once, without requiring any retouching or mending; and the German method of teaching dispenses with softened edges, but insists on the regions of tints being marked distinctly with precision; the true effect of the soft edge of a shadow is given by three or more changes in the tone as it passes from light to dark. The effect of block-printing is a result of this teaching, but this is not disadvantageous, inasmuch as the majority of students who work in this material are designers who are engaged in designing for prints of various textures, or those who are being prepared for this occupation. In general it is assumed that tempera is the material in which designers should work in preference to water-color or even oil. It has not been found necessary to develop the still-life section, not even for decorators.

The modelling section is excellent, and has a large and beneficial influence on the arts of the town. Berlin, like London, is a town of brick construction; the bricks are covered either with stucco, or relieved with stone carving, or decorated with terra-cotta. The excellence of the ornamental designs is remarkable all over the town and its suburbs, and I suppose some recent buildings in brick and terra-cotta are the finest ever constructed of this material. The character of fitness is found everywhere in these applications of the decorating material, and gives evidence of sound principles in teaching. These principles are first, no doubt, given to the architects who design the buildings, but a considerable amount of the credit is due to the modellers and carvers who carry out the artist's design.

In the Gewerbe Schule it is not surprising to find that one hundred students out of a total of six hundred are modellers; the care taken in their education is very great. They are taught to model from photographs of Italian ornament, never from lithographs nor drawings; and are further so instructed that they alter the relief from that shown in the original. This work goes on until the student has all forms of Italian ornament at his command, and has further an intimate knowledge of the principles on which it is constructed. Then he composes and carries out subjects under his teacher's eye; this brings him into the practical region of his artistic life, as he can sell his design if it is a practicable one. Men and women work together to their mutual advantage.

Another section is that of majolica painting, a revival by an Italian artist with students under him, which is being done entirely by the ancient methods, in rooms set apart in the Gewerbe Schule. The result when good, that is to say, when body, enamel, glaze, and colors are successfully applied and well fired, is excellent, but the failures are so many that this happy result is not frequently attained, and it is to be doubted if a commercial success will be the result of the adventure.

A principle of this school seems to be that no professor should be a teacher only; the directors therefore seek for men in various professions, such as architects, designers, etc., who can give a part of their day or evening to the classes; the tendencies to pedagogic degeneracy, often said to characterize men who give all their time to teaching, is justly feared.

THE ACADEMY OF ARCHITECTS.

A very useful institution has been founded by the architects of the

[1] From a paper by John Spencer, Head Master of the National Art Training School, published in the *Architect*.

town. They have a house of meeting, with which is joined a club for social purposes. A large hall or exhibition room in the building is set apart for the public display of all products that the architect is concerned in using or producing, other than those required in the mere construction of a building. There are marqueteric floors, stoves, curtains, furniture, glass, china, various applications of hand-rails, staircases, wall-decorations, etc.; also vessels of metal and pottery as ornament. These are constantly added to and changed, and the exhibition forms a gauge of the advancing taste in the decorative arts. The textile reproductions of Byzantine and Gothic tissues are remarkably picturesque. In furniture the best objects are copies from the Renaissance period, and a certain pseudo-French style which is not objectionable. The designers in this section are behind our own, both in simplicity of construction and taste. Some of the most beautiful imitations or revivals were seen in the tarsia panels of proper wood inlays for doors and other parts of a room requiring decoration. They are growing into extensive use, and are interesting as being the direct product of the Gewerbe Schule. Some of the textile reproductions are excellent, especially those of Byzantine origin, where a flat treatment with interwoven threads of gold is a principle of the design. Others of commoner material in wool, and even in hemp and cotton, were quiet and unobtrusive in tone and color, and often in excellent taste.

The iron work is remarkably good. There seems to be quite a school for smiths' work in Berlin; the cast-iron work is of world-wide renown for its fineness and mechanical perfection. In every quarter of the town the iron designs, and execution of the same, are alike excellent, and the very general use of grilles to the basement windows, sometimes to the ground-floor windows, and almost always to those of the hall door and fanlight, in the best class of houses, keeps up a substantial demand for designs of good quality which are remarkably well worked out.

The stove commonly used is a construction of tiles, made of suitable size and shape to be useful as to the dimensions of the flues and for the purposes of the bond; it is usually white, and gives a large field for the ingenuity of the designer. A modern demand for a fire that shall be visible has necessitated various modifications of the German stove of the past generations, and has resulted in ingenious, and on the whole good, architectural designs for fire-places. The material of which the tiles are made is of ordinary character, but the enamel with which it is covered is really perfect in whiteness and texture.

It is worth mentioning that the architects are almost always the designers of these house-fittings, and that designers not educated as architects are almost unknown. This is perhaps a point that might be dwelt on at length when we consider that training in the construction, proportion, and details of the different styles of building and use of mouldings is one of the most useful points in the education of a designer.

The Academy for Architects in Berlin is a peculiar institution that will shortly disappear. At the present time Berlin is the only large town in Germany without a polytechnic school, and the various arts taught in such an institution are now found badly housed in separate buildings, with separate organizations of directors and professors. But a recent Act of Parliament has ordered that a polytechnic school capable of accommodating from 2,000 to 4,000 students shall be erected, in which the present divided schools for architecture, engineering, and industries shall be united. The English system of apprenticing or articling of pupils to eminent men who are engineers or architects is practically unknown in Germany, and the State takes almost the whole expense and responsibility of educating students in their professions, and even to some extent of providing them with work after they are educated. It is clear that nothing analogous to this exists in our own country, and that the thorough education secured by the German plan is not easily gained in this country. The bases on which the whole architectural education is founded are twofold, — one the artistic, and one the constructive. On the one side, mechanical construction in its widest sense — that is to say, as applied to all known materials from stone to iron and wood — is thoroughly undertaken; and on the other side, the artistic, the full meaning and effect of antique proportions, mouldings, and the esthetic conditions of all the great historic styles, are elaborately analyzed and understood. The work in the building academy is done under great inconveniences on the score of space. The Schenkel Museum, in which the work is carried on, was designed by the architect whose name it bears, for the accommodation of from 150 to 200 students; this number has been recently raised to above 1,000, with obvious inconvenience and loss of comfort to the students and teachers.

A four years' course is provided for young men who give satisfactory proof of having received a good general education. In their progress they take first the simple Greek proportions, and their constructive and esthetic meaning, and work out, first, studies based on Bötticher's principles; then they design some specified building, such as a tomb, a town gate, or some other simple construction. Later, Italian, Romanesque, and Gothic are taken up in the same manner. This branch of their education is to serve the one end of artistic effect and the true principles of the different styles. But at the same time the proper knowledge of the builder is carefully kept in view, and is treated as a separate study from that part of the course which develops the artist. The examinations are frequent and very searching. Measuring actual buildings is given as an examination exercise, and not as a part of the instruction, as with us.

The private and public buildings in Berlin and other German towns give ample evidence of the thorough training of German architects under this system; but at the same time there is a certain coldness or uncompromising exactness about the whole that seems somewhat as if the classic lines by which the architect's education is so rigidly circumscribed had cramped the picturesque element in his art, and had decided the exact form and proportion of everything, to the smallest moulding. In the practice of Gothic architecture the result of this plan of education is indisputably one that gives great prominence to the advantages of our own system, or absence of system, in the education of the architect.

In the section of design, however, the Berlin school has many advantages over similar institutions. The professor, Herr Jacobsthal, the author of a very practical work on the "Grammar of Ornament," is a most accomplished teacher. The result is that German architects are found capable of dealing with details of ornament in a degree far surpassing that of the average professional designer here. Hence, no doubt, the superiority of the iron work, terra-cotta panels, and classical or Italian details, which truly ornament and do not overload their buildings.

CORRESPONDENCE.

FALL OF A HOUSE ON FIFTY-THIRD STREET.

NEW YORK.

SATURDAY afternoon last after the workmen had quit work upon a building on the corner of Fifty-third Street and Broadway, the structure quietly collapsed, and came down a heap of rubbish. Nobody was injured or killed and the excitement soon passed away. The building was four stories high, having a frontage of forty-three feet six inches on Broadway, and a depth of twenty feet on Fifty-third Street. This last front was of brown stone ashlar, while the side showed a wall of face-brick, and on the first or ground floor a row of supporting iron columns. The property was bought as a speculation by Mr. E. Livermore, a banker of 19 Nassau Street, who had already built a row of houses along Fifty-third Street, and was completing the covering of his land by putting up the corner house. It is said that the work was going on by "days'-work," but in any case it was as poor a piece of construction as could possibly come within the usual specification clause of having things done "in a workmanlike manner." It fell within the law, but it was nevertheless a "skin job," — work where economy has first and stability a second consideration. The work had progressed past the "brown-coat" with the plasterers, and the carpenters were just about to begin the "trim" when the collapse occurred. The rear wall is of common brick twelve inches thick throughout its height, a plain bulk-head wall without openings of any kind, to which a chimney gives some additional strength. The Broadway wall was a twelve-inch one too, but the facing of four inches virtually left only an eight-inch wall to carry the beams. The joints were wide and the mortar rather inclined to crumble, though the square pier columns on the first floor looked of ample strength. What the character of the footings is could not be ascertained under the mass of *débris*; but here, no doubt, the fault will be found to lie. The plumbers had been carrying in pipes from the street, and had dug below the area bottom. The heavy rain of a night or two before had soaked the walls, and the cellar had in it a large amount of water, which it is thought had worked under the pier foundations and caused them to either settle or slip. The break extends from the cellar to the roof, leaving only the end walls standing and exposing the entire interior. Had it been properly shored and the windows put in soon enough, no doubt the building would have housed for a long time the four families it was intended to accommodate. The only wonder is that a greater number of our cheap dwellings do not topple over when they get to the stage where this one came down. It is simply ridiculous to expect a brick wall nominally twelve inches thick, but with the bond used virtually but eight inches thick, to carry four tiers of beams and such weight as may be put into the building, in which not an extra foot of timber was used in bracing. Proper inspection might detect these cases before they get to the falling point. Somebody should have noted the plumbers at their work or have known that it was necessary to have a dry soil when the foundation was so poor. As it was, non-inspection or stupid workmen brought on the fall. Since no one is killed, whatever of investigation there will develop nothing, as it is to be conducted by the Building Department into what is really its own misconduct. W.

HUMORS OF COMPETITION.

BOSTON, August 30, 1878.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir, — As "they laugh that win," we have no occasion for sadness. Yet it is only fair toward other gentlemen of the profession that we should warn them against the latest trick in competition of which we have knowledge.

Having accepted the invitation of a committee from the Congregational Society in Holbrook, Mass., to submit sketches in competition with three other architects, — whose names were given, — for the rebuilding of the church edifice destroyed last season by fire, we

sent in our contribution, and, as is usually best under such circumstances, dismissed the subject from our minds.

In due time the various sketches were presented by the committee to the parish for consideration and possible selection. At this meeting, a private one called for the purpose, appeared, piloted by a friend who is a member of the parish though not of the committee, *one of the competing architects*, who "had not been able to get his sketches ready in time for the express, and so had brought them down."

Being there, the gentleman was granted permission to explain his design, which he did, taking occasion to let it be understood that he was prepared to contribute a portion of his commission to the treasury of the Society, could he but have the opportunity. Notwithstanding this, the parish voted to adopt the design of the authors of this communication, — upon which the gentleman accompanying our competitor moved that, inasmuch as the plan did not give the exact number of six hundred sittings, the vote be reconsidered, and our sketch, along with that of the gentleman who had got himself smuggled into the meeting, be returned to their authors for modification; the parish, groping somewhat in the dark, as all such bodies do for a time, took the proposed action. Monday evening last having been assigned for final action, our competitor again entered upon the meeting, notwithstanding he had been informed such a proceeding would be considered out of place; and, obtaining consent, proceeded to explain additional drawings which he had brought, and to read a considerable specification of materials and labor.

However, the result (the very quick result, as we are told) of all this was not such as to encourage its repetition, but went to show that at least one body of gentlemen were capable of holding at their proper value such enterprises and their authors.

We are tempted to give you the name of the architect, but think finally we will keep it for the private information of such of our friends as may be invited to compete hereafter in Norfolk County.

H. and T.

BLACK MORTAR.

York, Pa.

To the Editor of the American Architect:

Dear Sir, — Will you please inform me what proportions are generally used to produce good black mortar for brick work. I have for several years past used lamp-black ground in water, and mineral black mixed with a small proportion of cement, together with lime and sand. Comparing the joints made with this mortar with some in your city a few weeks ago, I find mine rather dull and weak in effect; my brick-layers also complain of its setting too fast. Any information regarding the above will be duly appreciated or gladly remunerated by Truly yours, J. A. Dempwolf.

NOTES AND CLIPPINGS.

We desire to draw attention to the following page, wherewill be found a list of churches now building in this country and Canada, which, incomplete as it is, cannot but be interesting to professional men and laymen alike, as it betokens an activity which is not confined to any one section of the country.

A Reminder of Old Customs. — During the repairs going on in an old building in Plymouth, Mass., last week, a large section of the plastering gave way and broke two large lights of glass in one of the windows of the store beneath. The cause of the fall was found to be a large accumulation of beach sand, which, in old times, before the days of carpets, was sprinkled on floors and drawn with a broom into fantastic shapes. This sand had sifted through holes and cracks in the boards until several bushels had accumulated above the plastering, and its weight at last caused the fall. The building was built in 1698.

The Eros of Praxiteles. — According to ancient writers, that one of the statues of Praxiteles which approached most nearly in sensuous beauty the famous Aphrodite, of which the Venus de Medicis is generally supposed to be a copy, was the statue of Eros, which, it is said, was presented to the town of Thespiæ by the notorious Phryne. The story goes that she, doubting her ability to select the best of the works of Praxiteles, and being determined to have none but the best, caused an alarm of fire to be raised while she was in the studio; and when she saw that he was most anxious that the figure of Eros should be saved, selected that as her gift to her native town.

Chinese Labor. — A company has been formed in Algeria for the introduction of Chinese laborers, on account of the scarcity of hands for timber-cutting and mining operations. It is asking to be secured in a monopoly of the business, but question is now raised as to the policy of promoting its progress at all.

Gas-Heating. — It is said that one of the church edifices in Berlin, the cubical contents of which are 2,780 meters, is heated by two gas-stoves, 1.40 m. high, 1.10 m. long, and 65 centimeters in width, each having seven brass gratings sixteen inches by two, equal to two fifths of an inch square per cubic meter of the contents of the building; the annual consumption of gas, for warming three times a week, is 1,485 cubic meters, or at the rate of 410 liters of gas per cubic meter of contents. At Hamburg, an edifice with cubic contents of nearly 40,000 meters is heated by eight gas-stoves, each having thirty two brass gratings, twelve inches long by about one and a half wide; three liters of gas are required per cubic meter of capacity.

Besieging a Cement Quarry. — The political history of the past decade has familiarized us with the spectacle of men resorting to violence in support of political offices to which they had claims, more or less impeachable on the ground of fraud. Sieges of barricaded State-houses, insurgent legislatures, and riots calling for the intervention of federal authority, have added fresh blots to the history of Louisiana and South Carolina, blots which have had their lesser reflections mirrored in the riots at East St. Louis this summer, where for a time a dual mayoralty, its representatives supported by rival constabulary forces, put the life of the ordinary citizen into no slight jeopardy by street fights. It is not often, however, that in every-day life resort is had to arms to decide questions of disputed ownership in real property, except, perchance, in the lower walks of life, where the constable has to enforce his writ of ejectment with the aid of a *posse comitatus*. Legal processes are usually efficient to determine ordinary business troubles, but in the town of Rosendale, N. Y., last week, occurred a siege of a fortified place, which was conducted with much of the circumstance of war. For some time past the New York Cement Company's quarry in Rock Lock has been the subject of litigation, which resulted lately in the election of a new board of directors, who declared that the contract of the present lessee was null and void. As this conclusion was not agreeable to the lessee he prepared to defend his claim by force of arms, and building up a breastwork of stone at the quarry's mouth, he entrenched himself behind it with his supporters. To make the defiant of his enemies certain several kegs of powder were placed under this barricade, and were connected with the wires of a galvanic battery. For three days and nights was the siege sustained, till at length the besiegers, sixty strong, advanced to the assault. The besieged, who numbered forty men, under the command of the "Honorable" Isaac Becker, although much better armed than the attacking party, were driven from the quarry, which is now worked under the orders of the new board of directors. Fortunately the crowning outrage of this strange incident was not committed, for owing to some unexplained chance the mine was not exploded.

Accidents. — At Louisville, Ky., a portion of a dilapidated and uninhabited building fell during the night of August 26 without causing injury. Accidents of similar character have happened recently at the Chicago Custom House and at the Hartford Capitol in the falling of large derricks; in the case of the Custom House from the top of the walls into the street below, where it only destroyed a hack, and in the Hartford case from the base of the dome into the building. A two-story frame building on Plymouth Street, New York, fell in the evening of September 5. A family living in the upper part of the building, which was used for the storage of sand, escaped without hurt. The unfinished spire of the new Catholic Church at Bradford, Penn., fell on the afternoon of September 6, and inflicted fatal injuries on three workmen, who were carried with the wreck to the ground, nearly one hundred and thirty feet below.

The Metric System. — The International Congress on Weights, Measures, and Coins unanimously adopted, at its session recently held at Paris, a resolution deploring the fact that England, Russia, and the United States had not yet adopted a metric system. The American and English delegates afterward adopted a resolution petitioning the English and American governments to appoint a mixed commission to consider the adoption of a metric system by both countries.

Tenement. — The Sanitary Code of the city of Brooklyn gives the following definition of a tenement house: "That a tenement house shall be taken to mean and include every house, building, or portion thereof which is rented, leased, let, or hired out to be occupied, or is occupied as the house, home, or residence of more than three families living independent of one another, and doing their cooking upon the premises, or by more than two families upon a floor so living and cooking, but having a common right in the halls, stairways, yards, water-closets or privies, or some of them."

Memorial Cathedral to Queen Mercedes. — The Paris *Figaro* states that it is the intention of King Alfonso to build a cathedral as a mausoleum for Queen Mercedes. The building fund will be obtained by subtracting yearly from the king's civil-list the sum of forty thousand dollars, while the Duc de Montpensier and the Princess of the Asturias will make a yearly contribution of twenty thousand dollars. Besides this, it is said that Queen Isabella has authorized, for the same purpose, the sale of certain jewels which were deposited in the Cathedral of Atocha. These jewels are said to be worth six hundred thousand dollars.

Discovery at Newbattle Abbey. — The Edinburgh *Scotsman* says: "While preparing some additions that are being made to Newbattle Abbey the workmen recently came upon what has proved to be the foundation and base of a chapel in an excellent state of preservation. The basement of the building is two hundred and sixty feet long and about sixty-seven feet broad, and there are numerous massive pillars which are believed to have supported a groined arched roof similar to that of the crypt at present in course of restoration in the abbey, and which is supposed to have been built about the year 1140. Many elaborately carved stones have been found, and these, with the beautiful moulded work to be seen on fragments of the groined arches and pillars, proved that the mason-work must have been of a very superior nature, and in style akin to that of Melrose and Kelso abbeys."

The Gratitude of Corporate Bodies. — The New York *Tribune* says that the Roman corporation keeps Prince Torlonia, the aged millionaire, whose charities have been regal, in a state of prickly worriment. He had a palace in the Piazza Venezia and a little palace or palazzetto adjoining it. In order to make way for the Via Nazionale the palazzetto was cut off and knocked to pieces. But the civic authorities were not satisfied. The beauty of the new street was disfigured by an awkward corner of the larger palace, which had been exposed to view; and the prince has now been told that he must sacrifice for the sake of public taste that portion of his property. He will be deprived of two rooms in which he has passed a great part of every day for many years, and for which he has a particular affection.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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CONTENTS.

SUMMARY: —

Mr. Waterhouse at Manchester. — Criticism of Architects. — Decorative Art in Paris. — Mr. Walker on Coöperation. — The Sacramento Anti-débris Association. — The East River Bridge. — Art in Chicago 97

THE REPORT OF THE MASSACHUSETTS BOARD OF HEALTH . . . 98

PAPERS ON PERSPECTIVE. XIII. 99

THE ILLUSTRATIONS: —

Alterations at Stamford, Conn. — Design for a Country House. — Staircase, Hall, and Fireplace in Boston. — Cottage at Lebanon, N. H. — Study in Perspective. Plate XIV. . . . 101

AMERICAN VERNACULAR ARCHITECTURE. V. 101

CORRESPONDENCE: —

Letter from St. Louis 101

COMMUNICATIONS: —

Cesspool Ventilation 102

THE DWELLINGS OF THE POOR 102

ST. ALBAN'S NAVE 103

NOTES AND CLIPPINGS 103

IN his late address before the Manchester Society of Architects, Mr. Waterhouse took what has seemed to us to be the manly and sensible position in regard to the criticisms which the public has been prone to make on the work of architects, and the distrust of them which is now and then shown. He said: "May we not be becoming over-sensitive to adverse criticism? Does not the attention bestowed upon our works by some distinguished and cultivated people show a satisfactory interest in modern architecture? and though they may abuse its want of vitality, — sometimes as we may think, ignorantly, — is it not better for our art that their utterances should be sometimes adverse rather than non-existent?" It is in truth the popular interest in what architects are doing, the sense of its necessity, that makes the public care to criticise them. Herein, as we have once said, is the architect's opportunity. It shows him that the work he is doing is of recognized importance, and that if he can command approval his reward is sure. If the public turns to builders or to engineers to do his work, it is simply because it expects to get certain things from them. It becomes the architect's duty to show that so far as these things are a part of his work there is no advantage in going to anybody else for them; that on his own ground he is superior to the engineer and builder, and on common ground he is their equal. From any ground on which he cannot compete with his rivals he must be content to retire, and his professional pride cannot save it to him. We are apt — architects, and American architects perhaps more than others — to make the twofold mistake of assuming that public criticism is an offence, and that we have nothing to learn from it. The criticism of the public is mostly of a practical kind, and indicates practical wants that the public will have supplied by one person or another. There is no practical requisite of our work which we cannot supply to its satisfaction if we will take the trouble, and when the public is convinced that we do this there need be no fear of intrusion by rivals in our proper field. In architectural design the public has always been led by architects, and always will be unless they forfeit its confidence by incapacity in other things which it can better understand. Even here the criticism is of value. It may be often wrong, but it will be often *right*, and if we were accustomed to listen to it we should soon learn to distinguish tolerably well when it was right. Our architecture is by no means above criticism, — we may as well confess that on the whole it is not very good, — and if to general criticism we could habitually join a professional criticism which should be at once kindly, discriminating, and outspoken, and could learn not to receive dispraise as an affront, but to study what value it might have, our improvement would be quicker.

IT has been the habit to believe that decorative art had its home in France, and *par excellence* in Paris, where it grew so naturally as to have no need of the artificial stimulus of a protective association. But it seems that the great advance which the world outside of France has made in this respect of late years has roused the French into some alarm lest they should lose the preeminence which they have been accustomed to consider their own. A society for the encouragement of such art has therefore been formed in Paris, among whose many presidents are the Prefect of the Seine, the Duc d'Audiffret Pasquier, and other notabilities less notable abroad, and with Mr. Cunliffe Owen and Sir Richard Wallace among its honorary presidents. About a hundred and fifty thousand francs was soon subscribed, and a museum was opened with small beginnings in the Pavilion of Flora, in the Tuileries. The society has issued a prospectus calling attention to the advance shown in the decorative work displayed in this year's exhibition by foreign nations, among which Americans may be gratified to find their own mentioned; and reminding their countrymen, probably without exaggeration, that though they "possess, in virtue of their innate taste, a superiority," they must gradually lose it unless they bestir themselves to get the full advantage of the traditions of art which are transmitted among their workmen. Thus it appears that international exhibitions, however doubtful their profits in some respects, continue to bear substantial fruits. The present advance in art of England dates, as we know, from the first world's fair of 1851; our Centennial — favored to be sure by a pre-existing influence in society — has given an immense impulse in the same direction to American industry; and now we see that even in France, secure as she has thought herself in her prééminence, the like opportunity produces the like result.

WE have not seen in any of the recorded testimony before the Congressional Labor Committee more clear sense than in that of Mr. J. H. Walker, a shoe manufacturer of Worcester, Mass. He has written it out at length, at the request of the chairman, and has printed it in the *Boston Daily Advertiser*. It would make an improving pamphlet for distribution among those of the workingmen who are open to instruction on the causes and difficulties of their present condition. The experience of coöperation which he cites is worth quoting for the illustration it gives of the difficulties of this remedy, and the unprepared condition of the workmen's minds at present. The experiments which Mr. Walker has tried, and those which he has watched, have been unsuccessful, because, he says, the workmen cannot be made to believe how small the percentage of profits in manufactures is, and are unwilling to wait for their slow return. Eight years ago he tried to interest his operatives by offering them a share of profits. He asked them to contribute from their wages to the working capital of his business, allowing them their share in the profits *pro rata*, and without taking any account, in the division, either of interest on the "plant," or of compensation for the services of any member of the firm. But no workman below the grade of foreman was willing to try the experiment. Another large manufacturer, who tried coöperation on a different plan, divided a quarter of his net profits among so many of his workmen as stayed long enough to earn a certain sum in any year, — $100 for men, and $50 for women. This was done for six years, in the hope of encouraging good work and economy of material, the dividends being from two to five per cent. (on the capital?) each year, except one year when there was none. But the men could not be made to believe on what small economies of material the profits depended, nor that the dividends, which they expected to be many times greater, were honestly made. The experiment was given up, as of no real benefit, but rather a breeder of distrust and annoyance.

THIS is no more than might be expected by those who will consider the ignorance, not only of workmen, but of all inexperienced people, concerning the employment of capital. Such people are not easily persuaded how small the ratio of profit is to actual disbursement, or to the number of people engaged, just as the communist cannot believe how little way the riches of the wealthy would go, if divided among the poor. If the weaver, tending two or three looms, each of which turns off say forty yards of cotton cloth in a day, could have it fully borne in upon him that the profit of manufacture was only a quarter or even an eighth of a cent the yard, and be made to see that his share of that when it was divided among all concerned must be a small one, he would have a useful lesson. But this is not learned by such experiments in coöperation as Mr. Walker describes, or by any that capitalists are likely to offer. Here is the weakness of all systems of coöperation yet proposed, between manufacturers who must naturally insist on administering their capital, and

their workmen; and here is the value of such attempts as that we mentioned a fortnight ago, by the Crispins of Chicago, to establish a manufactory, by their own capital, and under their own management. Such an arrangement as that devised by Mr. Walker, we may add, could hardly be expected to satisfy the workingman, liberal and even generous as it was in its kind; for it does not answer to his idea of what ought to be allowed him, which is an opportunity, not to save capital for himself, and invest it to advantage under the control of other persons, but to receive for his labor alone, over and above his wages, and with no need of saving, a share in whatever profit is made. Even if this were found to be practicable, however, it would not lead to the result that is the condition of a healthy relation, which is, that if he is to concern himself with capital he should understand the necessities of its employment; the other condition, that he should contentedly acquiesce in the management of those who are wiser than he, being apparently a thing of the unreturning past.

The war between the farmers and miners in California promises to be a close struggle. An association has been formed, to include the farmers of the whole Sacramento region, which is called the Anti-débris Association of the Sacramento Valley. Its purpose is "to prosecute to the courts of last resort" the suits entered by the farmers to defend their estates against the ruin which is threatened them by the débris with which the hydraulic mining companies are flooding the rivers. The litigation must necessarily be very costly, for the interests involved are enormous, and the suits will be contested in every successive court to the last possible point. The subscribers to the association pledged themselves to an assessment of three per cent. on their assumed interests in the contest, and showed a strong determination to carry it to the end. At the organizing meeting, $170,000 was subscribed as the fund on which the assessment was to be levied, but this is probably only a small part of what will be needed to carry on the war, and of what is expected from further subscriptions. On the other hand the mining companies throughout the State are united for the defence. Being wealthy, and more used than the farmers, by virtue of their occupation, to stake their money on hazards, they will make the struggle a long and expensive one.

The whole amount expended on the East River Bridge up to the first of September is shown by the report to the trustees to be $9,833,988, and the amount due upon it, $112,309. The granite necessary to complete the anchorages had been contracted for at a cost of $17,467, and to this must be added 32,000 pounds of iron stay-bars which must be built into the anchorages, at a cost of $1,920, as soon as the great cables are finished, in order to bring the work to this point and make it secure during the winter. To provide for this necessity the recommendation of the Executive Committee was adopted, authorizing the officers to borrow money to the amount of not over $200,000, in anticipation of payments expected from the two cities of New York and Brooklyn, and an order was passed to bring suit against the city of New York to enforce payment of the sums due from it, which the city at present refuses to pay. The subject of the transit of freight and passengers was again referred to a select committee of five trustees, with a view, we suppose, to the vexed question of running trains of cars over the bridge.

The Chicago Academy of Design, reorganized last spring, as we have before described (*American Architect*, May 25, 1878), is promising an active year under its new management. The day schools are fairly at work under Messrs. Earle and Spread; the evening schools were to have opened this week with a class for drawing from the antique, to which a life-class is to be added by and by. A course of historical lectures upon architecture is to be begun next month by Mr. Jenney, late professor of architecture in the University of Michigan. Mr. Leonard Volk, of Chicago, the sculptor of the Douglas monument, is busy with the first of the four statues which he is to model for its base. The figure which is to personify the State of Illinois is to be sitting on the right of the door of the tomb, holding in one hand a shield and in the other a shock of corn, and dictating the story of Douglas's life to History, toward whom her face is turned, and who is to sit on the other side of the door, recording the story upon a tablet. The figures are to be of bronze and of heroic size. It is expected that they will be finished before the summer.

THE NINTH REPORT OF THE MASSACHUSETTS BOARD OF HEALTH.

It was a habit of rustic cynics a generation ago, and, for aught we know, of other cynics, to quench their more fastidious fellows with the dictum that every one must swallow his peck of dirt, — an adage that was mainly of use as an excuse for making the peck a bushel. It had not a scientific basis, but all the researches of modern sanitary science seem bent to show that it was at least within the mark, and that one may be content if he can, with the utmost precaution, keep within this allowance, and can insure that it shall not be poisonous as well as dirty, — in so many and so insidious ways does obnoxious matter intrude itself into what we eat and drink and inhale. The cynicism is apparently not abated by the verification of the adage, even when enforced by the lesson of danger that goes with it. Communities or households which have long lived contented in the conviction that a certain degree of uncleanliness is a matter of course are not easily brought round to the sudden belief, in apparent contradiction of their own experience, that it is pernicious and may be ruinous, at the bidding of a parcel of men whose science they distrust, and whose occupation seems to them idle if not impertinent. Hence the public apathy or hostility to the regulations which sanitarians propose, the slowness of people to learn that a vast amount of disease and death comes by common offences against cleanliness which may be and ought to be prevented by joint action or legal restrictions; and hence it follows that boards of health must add to the labor of providing for the public hygiene the labor of persuading the public that the provision is necessary, and justifies the degree of sacrifice which it requires.

How much the apathy prevails is significantly shown in this Massachusetts health report by the record of the votes cast at the last election, when it was set before the cities in the State by legislative act to decide whether they would appoint boards of health. Boston being up to that time the only city which had one. Out of eighteen cities, eight voted to appoint the boards, five refused, and five ignored the matter altogether. What is more surprising than the small success of the experiment is the small interest in it shown by the voting. In Cambridge, where the vote far exceeded that of any other city on the question, it was carried by 2,003 to 468, the population being about fifty thousand. In Lowell, a somewhat larger city, the vote was 983 to 335, and in no other which accepted the proposition was the aggregate vote greater than eight hundred. In Fall River, a town of about the size of Cambridge, it stood 174 to 52. Indeed, more enthusiasm was shown in rejecting the boards than in accepting them. Thus, in Gloucester, with about seventeen thousand inhabitants, the vote was 520 to 819; in Newton, with the same number, 545 to 779; in Fitchburg, with twelve thousand, 118 to 648; in Lynn, with thirty-three thousand, 312 to 739. Yet Gloucester, which refused to provide itself with such officers, is a town that is in an exceptionally unfortunate plight with its drainage, and has, within the past few years, been scourged with diphtheria in a manner that might be expected to bring the most disregardful population to reason; and Taunton, which did not honor the question with a vote, being in a very similar condition, was last year savagely attacked by the same disease.

The report itself of the Board of Health is a good example of what such a document should be, — clear, simple, and sensible in its recommendations, moderate and judicial in its tone. The subjects it has to deal with being somewhat unpopular, its recommendations are obviously tempered to the undeveloped condition of public opinion. In this we dare say the Board shows a true sense of what is practicable, while it stops short in several respects of what we should like to see done, and doubtless of what it hopes ultimately to accomplish. Its chief attention is given necessarily to questions of sewerage, of water supply, and of the pollution of streams, its most important practical recommendation being the passage of a bill which the Board has prepared and proposes for the action of the next legislature, to limit the pollutions of streams, with which are included ponds and tidal waters. The bill is very moderate in its provisions, and drawn with as much tenderness for existing rights or privileges as is consistent with reasonable efficiency. It forbids any town, corporation, or individual to discharge solid refuse of any kind into streams, public ponds, or tidal waters, or to interfere with their volume or flow except for the sake of sanitary or other improvements; and all filling or other "improvement" is to be under charge of the town authorities, subject to regulations of a

River Pollution Commission. In regard to streams or ponds used as water-supplies, the bill forbids any increase of the quantity of refuse now poured into them, or the discharge into them of any of the soil from dwellings within thirty miles up stream from the point at which water is taken. It is also provided that any refuse whatever that is discharged into such waters shall be purified to the satisfaction of the River Pollution Commission; but this provision, taken in connection with the preceding, is rendered almost nugatory by the limitation that it shall not apply to any now existing pollution. The pollution of other waters is to be regulated by the boards of health of the various towns, in conjunction with the Commission. Other sections of the bill are intended to protect towns which are sewered against the discharge into their sewers of substances which will injure or obstruct them, or make the sewage more difficult to dispose of. The plans of all new systems of water supply or sewerage and of all new dams are to be subject to the approval of the Commission, and the same restriction is applied to the arrangement of water-supply and drainage in all new state buildings. Finally, the direct discharge of soil from privies, water-closets, and wash-tubs — sinks and bowls might well have been added — into any stream whatever is forbidden.

The section which provides that in any sewered town "the local board of health shall, upon application from any parties, order any privy or cesspool to be abolished, and connection to be made with the public sewers," would be likely, unless modified, to lead to collision in cities like Cambridge, where an unfortunate ordinance exists that requires every house-drain to empty into a cesspool, from which only the overflow may be carried into the sewers. That privies and cesspools shall be abated is devoutly to be desired; yet to enact that in a town where they are required by ordinance the board of health shall, without discretion, abate any of them on application of any person, whether he be affected by them or not, seems to us to be making a law which must remain a dead letter, or else had better give place once for all to one which nullifies all such ordinances.

It will be seen that, excepting for the provisions against discharging into streams the soil from human dwellings, which in some form or other are absolutely necessary, the bill carefully abstains from interfering with existing privileges, and confines itself to preventing as far as may be any increase of the pollution which now is. Nevertheless, it is pretty clear that even the existing uses of the water will, if continued, in time do serious injury, and that therefore something more than the modest restrictions now proposed must by and by be imposed. In regard especially to defilement by soil from dwellings, the thirty-mile limit proposed by the Board in case of water supplies cannot be considered as absolutely safe, as it certainly cannot be counted comfortable, when doctors disagree as to the possibility of disinfecting sewage by any amount of dilution. One authority quoted in this report, the late Dr. Letheby, medical officer of London, claimed that sewage diluted with twenty volumes of water would be destroyed in a flow of six or eight miles: on the other hand the English Commission on the Pollution of Rivers has reported that "there is no river in the United Kingdom long enough to secure the oxidation of any sewage which may be discharged into it, even at its source." On the whole, cautious people and fastidious people will unite in concluding that the only course is absolutely to exclude, from all waters at least which lead to any water-supply, all taint of house-drainage whatever, and that in this case even existing privileges should give way without delay.

This year's report contains the results of a careful examination of the basins of the Hoosac and Housatonic rivers, illustrated with maps, and showing the condition of the towns in those valleys, and the kind and position of the manufactories which discharge their refuse into the streams. A circular was sent to manufacturers throughout the State, asking for information as to the actual pollution of streams, what kind of manufactories were most mischievous, and what the best remedies. The answers, when they were obtained, were conflicting, as might be supposed. Woollen mills, on the whole, seemed to be most unpopular, dye-houses and bleacheries perhaps next; but the reader of the report is led to surmise that the most offensive neighbor is apt to be the nearest. The remedies oftenest suggested are settling-tanks and irrigation. Some manufacturers agree that there is nothing to do with the refuse but to let it run, while other correspondents protest energetically that the only thing is "to keep the stuff out of the streams." Some of the conclusions which the Board draws from its examination will surprise many people, though no doubt they are fully sustained. One is that the hill towns are found to be distinctly less healthy than the valley towns, both pulmonary diseases and typhoid fevers being decidedly more prevalent in them, and the population on the whole less strong and well. This is corroborated by the results of some examinations made for the army during the late war. The reasons given are the thinness of the soil, underlain by impervious rock full of hollows, in which water is retained, making a damp subsoil; and the impregnation of this shallow ground and the wells in it with the discharge from privies, cesspools, stable-yards, etc. In Gloucester, where these conditions obtain, though it is not a hill town, and in North Adams, in the upper part of the Hoosac Valley, the soil has become so contaminated as to poison the ground and apparently to make pollution of the drinking-water the usual condition. In both these towns the ravages of diphtheria have of late years been startling. North Adams has now so far taken warning as to supply itself with pure water; Gloucester, as we have just seen, has continuaciously rejected salvation by means of a board of health. The drainage of such towns is, to be sure, peculiarly difficult. The report rightly objects to both ordinary privies and cesspools, especially those with dry walls, and says in regard to North Adams: "A considerable increase in the pollution of the Hoosac River, if that is necessary, would be a much less evil than those now existing of unremoved filth." This is probably true, but is nevertheless a doctrine to lend itself easily to abuse. It is worth while to keep clearly before people the distinction between offences where punishment falls chiefly on those who commit them and those whose injury is laid up for others; thus, between the acts of those who defile their own houses and those who poison the waters for their neighbors and the earth for their successors. The report rightly recommends water-carriage where it is practicable, and dry removal where, as in Gloucester, sewerage is very difficult, and it is not too severe upon cesspools. Yet it seems to us that surface irrigation, as in the Mould system, and even the use of tight uncovered vaults for dry-soil, where it can be easily disinfected and often removed if people will, and which ought to save the earth from contamination, is preferable to the discharge of sewage into any ordinary watercourses.

With the general report are included a number of special papers of interest, which we have not time to notice in detail. The description of a cottage hospital in Pittsfield is interesting, as an example of a kind of institution which ought to become common. We cannot, however, commend as a model the plan which Dr. Adams displays with some complacency. The contagious ward is in the midst of the servants' bed-rooms; the water-closets for male and female patients are massed together in the middle of the house, close to the reception-room and the main staircase. They are placed in the bath-rooms, an arrangement which is faulty in a dwelling-house and preposterous in a hospital; the soil-pipes are carried into the chimneys, and the drainage into leaching cesspools. It is a little amusing, after reading the grave condemnations of cesspools and the protests against contamination of the soil, of which the main report is full, to come here upon the naïve remark that "the soil, being a coarse, bibulous gravel, is well adapted for cesspools."

There is an interesting paper on dangers from color blindness by Dr. Jeffries; a report on the sanitary condition of Cambridge by Dr. Coggswell, not so flattering to that city as one might wish; a tabular report on the health of towns in the State, with detailed notices of the prevalence of diphtheria and typhoid fever in Gloucester and Taunton; a careful essay on scarlet fever by Dr. A. H. Johnson; and a not very encouraging report on the sanitary condition of public schools in Massachusetts by Dr. D. F. Lincoln, of Boston. The paper on filtration of potable water, both for domestic use and on a large scale for town supplies, by Professor Nichols of the Massachusetts Institute of Technology, is a clear and well-studied account of an important subject, full of interesting information and valuable suggestion. It deserves to be published separately in a form for general circulation.

PAPERS ON PERSPECTIVE.

XIII. DISTORTIONS AND CORRECTIONS CONTINUED; CYLINDRICAL, CURVILINEAR, OR PANORAMIC PERSPECTIVE.

271. The previous paper has discussed the so-called distortions to which circular, cylindrical, and spherical objects are subjected when drawn according to the methods of plane perspective, and has explained the so-called corrections which are applied to such objects.

Similar distortions, it was shown, attend the putting of the human figure into perspective, and similar corrections apply. Indeed, it was pointed out (261) that every object not exactly at the centre of the picture must necessarily be more or less out of drawing, though the distortion is not generally such as to attract notice save in the cases mentioned.

272. Plate XIV. demonstrates the existence of these distortions, exhibits some instances in which they are intolerable, even in the case of rectilinear objects, and shows yet another way of correcting them. By *distortion*, as has been said, we mean that the outline given in the drawing is different from the outline presented to the eye by the object drawn. Now the rays of light that pass from the outline of an object to the eye form a cone, whose base is this outline itself. The perspective representation of this outline is the line in which this cone of rays is cut by the plane of the picture. If this plane cuts the cone of rays in a direction at right angles to its axis — that is to say, if the object is at the centre of the picture — then the section is of the same shape as the base; the perspective is of the same shape as the object. But if the plane of the picture cuts the cone of rays obliquely — as must be the case with all objects not just at the centre — then the section is not of the same shape as the base, and the perspective does not look like the object; it is, so to speak, distorted. Of course, when seen from the station-point, obliquely, the perspective is foreshortened and looks just as the object does. But in itself, and when looked at merely as a line, it presents a different form.

273. This is illustrated in Fig. 70, in which is seen a rectangular block, drawn in parallel perspective, but considerably to the right of the centre. Its proportions are such as no rectangular block could ever possibly present to the eye. It exhibits three faces, one of which is a square. But if a rectangular block is held so that one of its faces shows four right angles, it must be held so that neither of the other faces can be seen at all. If on the other hand it stands so that two adjacent faces are seen, as this block evidently does, then all the angles must appear either acute or obtuse. The figure within the circle shows how the block really looks when one looks straight at it, and this is the way it is drawn when at the centre of the picture. The difference between these two representations exemplifies the distortion to which all shapes are subjected when the line from the object to the eye is not at right angles to the picture.

But this distortion in the drawing is corrected, by foreshortening, when one looks at the drawing from the station-point S, which in this case is a few inches in front of C, in Fig. 66. In fact, Fig. 70, *a*, was sketched from this point, and is a view not of the cube itself, but of the Fig. 70, *b*, thus foreshortened into a real likeness of the object it represents.

274. Fig. 66 exhibits other and even more striking phenomena. Take first the church on the left hand. It is horribly out of drawing, although the picture does not extend, on this side, very far from the centre. But the objects drawn are so placed as to make but a small angle with the plane of the picture, as may be seen in the plan below, and when this is the case, this sort of distortion often presents itself. It is often seen in old fashioned prints and in photographs of very long buildings, taken nearly in elevation. It arises, as is obvious, from both vanishing points, V^a and V^b, being on the same side.

275. The distortions at the other end of the picture, however, though less offensive and consequently much more common, are almost as great, giving the buildings quite different proportions from what they would present to a spectator at S. For the proportions of an object, that is to say, the relative size of its parts, depend upon the relative angular dimension of the parts, that is, upon the relative size of the angles they subtend at the eye. Their apparent distance apart, right and left, or up and down, is angular distance. A painter, then, who would represent things in their true proportions, as they look, and in their apparent relations one to another, would have to proportion the linear dimensions upon his canvas as to the angular dimensions of his object. And this, in fact, is just what every painter, every draughtsman of whatever kind, always does when he undertakes to sketch from nature. It is the method of every artist who undertakes, outdoors or in, to draw things as he sees them; he can have no other; he must give to the representation of objects the apparent shape and the relative size that the objects themselves present to his eye. In other words, he proportions the linear dimension upon his canvas to the angular dimension of the object. Now this is exactly what perspective does not do. In sketching, one may begin in the middle, fix the position of his central object, and distribute other things about it to the right and left, according to their apparent distance from it. Their distance is proportioned to their angular distance, and their size to the difference of the angular distance of their edges. But in a perspective drawing, as is clearly shown in the plan, the distance of an object from the centre of the picture is proportional to the *tangent* of its angular distance, and its size is accordingly proportioned, not to its angular dimension, but to the difference of the tangents of the angular distance of its edges from the centre. The scale to which they are drawn accordingly increases from the centre outward, just as in Mercator's Projection, which gives indeed a sort of perspective view of the terrestrial sphere, as seen from a station point at its centre.

276. It is plain that the scheme of making every linear dimension in a drawing correspond with the angular dimension subtended by the object could be thoroughly carried out only by drawing on the inside of a hollow spherical surface, a condition difficult to fulfil. A cylindrical surface, however, answers nearly as well, especially when, as is usually the case, the vertical dimensions are relatively small; a cylinder, moreover, has the advantage of being a *developable* surface; it can be rolled out flat. This is the surface employed in circular panoramas, and it is virtually that employed in sketching from nature. For as one turns from one object to another he virtually keeps the corresponding part of his canvas in front of him, just as if it were a cylindrical surface.

277. The plate illustrates the result of this procedure, and affords an opportunity of comparing it with the results of plane perspective. In the plan of the street we have the position of the spectator indicated at S, that of a transparent plane, representing a picture plane, at $p\ p$, and that of a transparent cylinder at $a\ c\ b$. The centre of the perspective picture is at *c*, the point nearest the spectator, and the plane and cylinder are tangent at that point. Visual rays drawn from the principal points in the street to the station point pierce both surfaces, and pictures drawn upon them would, when seen from the point S, obviously coincide with each other and exactly cover the objects represented.

278. Fig. 66 exhibits the result, as shown on the plane $p\ p$, and Fig. 67 that shown on the cylinder $a\ c\ b$. The first strikingly illustrates what has been said of the inevitable distortion of objects in plane, perspective, and of their gradual exaggeration of scale as they recede from the centre. Fig. 67 shows the effect of making the linear dimensions in the drawing correspond to the angular dimensions of the objects drawn, that is to say, of drawing everything just as it appears. Of these effects the most noticeable are these: that in the first place the distortion of the church on the left entirely disappears, and in the second place the distortion on the right disappears also, the houses and the landscape beyond being reduced to dimensions proportioned to the dimensions given to the nearer objects, while the size of the picture is greatly diminished. All this is a great gain. But on the other hand the horizontal parallel lines which in Fig. 66 are all straight and converge to a single vanishing point are in Fig. 67 all more or less curved, converging towards the two vanishing points of the system to which these lines belong, 180° distant from one another. This curvature would of course disappear if the paper were bent into a cylindrical form and the eye placed at the axis opposite the horizon, and in the large circular panoramas which are sometimes exhibited, and which have given to this method the name of Panoramic Perspective, this of course is done. But in general the developed cylinder has to remain flat, and it must be confessed that this curvature of lines which in nature are straight is itself a distortion which most persons find extremely objectionable.

279. It is worth while to remark, however, that this phenomenon of the apparent curvature of straight lines is of constant occurrence in nature; and it is just one of those phenomena of nature with which perspective has to do, being concerned with the appearances of parallel lines. All systems of lines which are long enough to indicate both their vanishing points, converging to one point on the right and to another on the left, have an apparent curvature. Such are the long parallel lines of cloud which often cover the sky, or the sunbeams and shadows which sometimes at sunset pass completely over from west to east. In both these cases each particular cloud or sunbeam, as one looks at it, seems quite straight; but all the others on either side seem concave towards it. In fact, as they all meet, or tend to meet, at two different points, and to separate between them, they *must* seem curved; *straight* lines can meet at only one point.

It is the same with the horizon itself, which seems straight when one looks at it, but seems curved when one looks up or down. So with other long lines, such as eaves, sidewalks, and house-tops. As one turns his eye rapidly from one end of a street to the other, the apparent curvature reveals itself unmistakably.

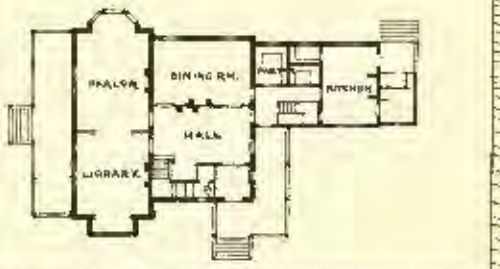
280. To one who is accustomed to observe this curious phenomenon, the curvature of the lines in cylindrical, or, as we may now call it, *Curvilinear Perspective* is but a trifling evil, hardly to be counted against its manifold advantages. Of these the chief is perhaps, as has been said, the perfect conformity of its results with those obtained in sketching from nature. Of this an excellent illustration is afforded by Fig. 68, a rude outline sketch from a water-color by Turner, representing the Ducal Palace at Venice, and the adjacent buildings. He sketched each building just as it looked, and did not mind the resulting curvature of the horizontal lines of his drawing.

This drawing exhibits, however, what is perhaps the most objectionable distortion of all, an apparent convexity in the objects represented. The quay, which in fact is straight, looks convex.

281. But perhaps, after all, the chief merit of Curvilinear or Panoramic Perspective is this: that it permits the limits of the picture to be extended indefinitely without the rapidly increasing distortions to which plane perspective is liable. Fig. 69, which is borrowed, though much reduced, from a rare and little-known work, by Mr. W. G. Herdman, published in Liverpool in 1853, exhibits this excellence in a striking degree. It represents the meeting of two streets in some foreign town, and succeeds in showing both sides of both streets, without distorting any part of either. The horizontal angle embraced must be more than a hundred degrees. The dotted curved lines which in the original were carried across the picture in order to show the theory on which the drawing is constructed, are here omitted. Where the sky-line is as broken as here, and the continuous horizontal lines are so few, the disadvantages of this method, as is evident from the figure, are reduced to a minimum.

No 148. American Architect and Building News Sept 21 1878.

DESIGN FOR A COUNTRY HOUSE. R. G. KENNEDY ARCHT.



PLAN OF FIRST FLOOR.

The Heliotype Printing Co. 330 Dartmouth St. Boston.

PLATE XIV. CURVILINEAR PERSPECTIVE.

FIG. 66

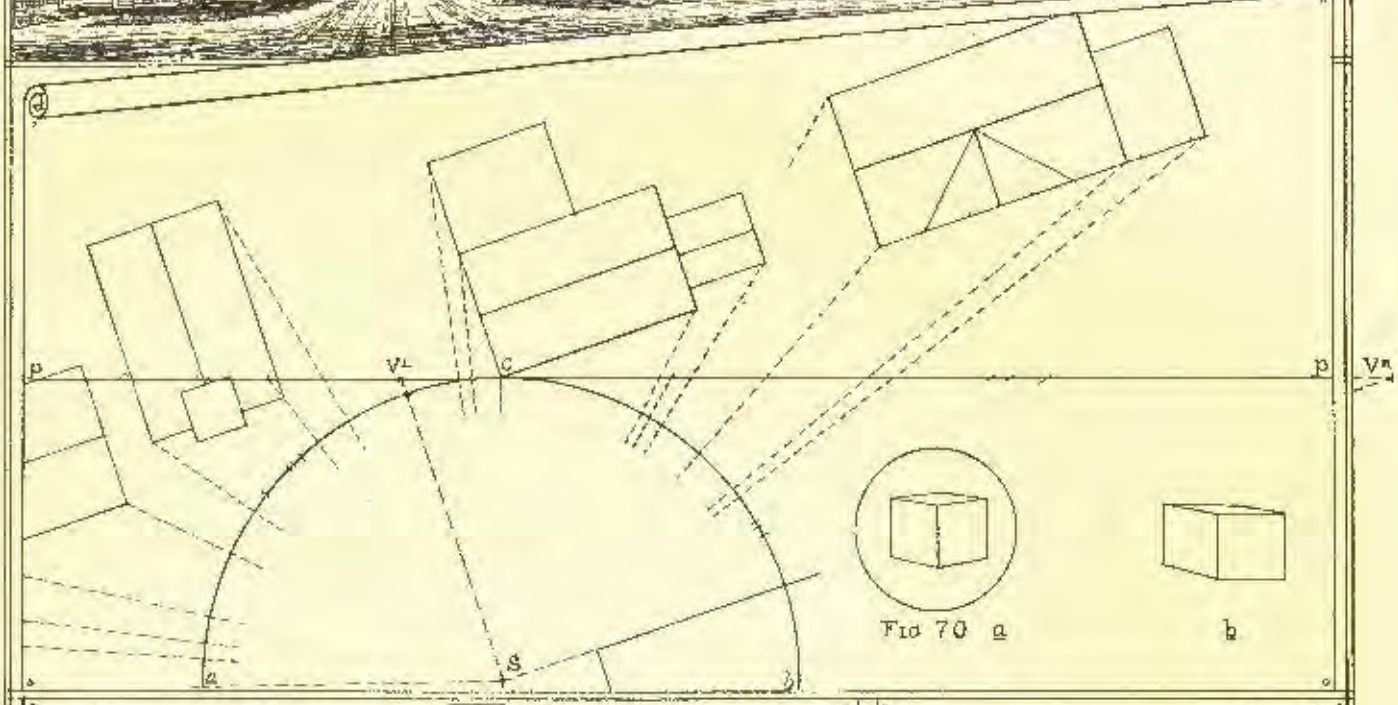


FIG 70 a

b

FIG. 67

FIG. 68

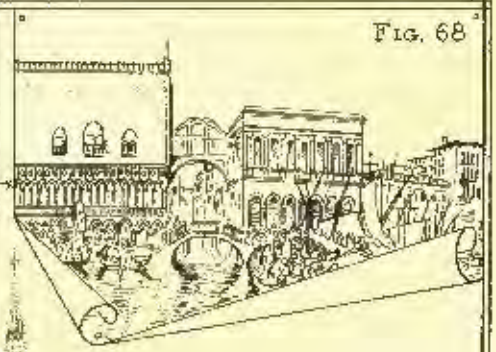
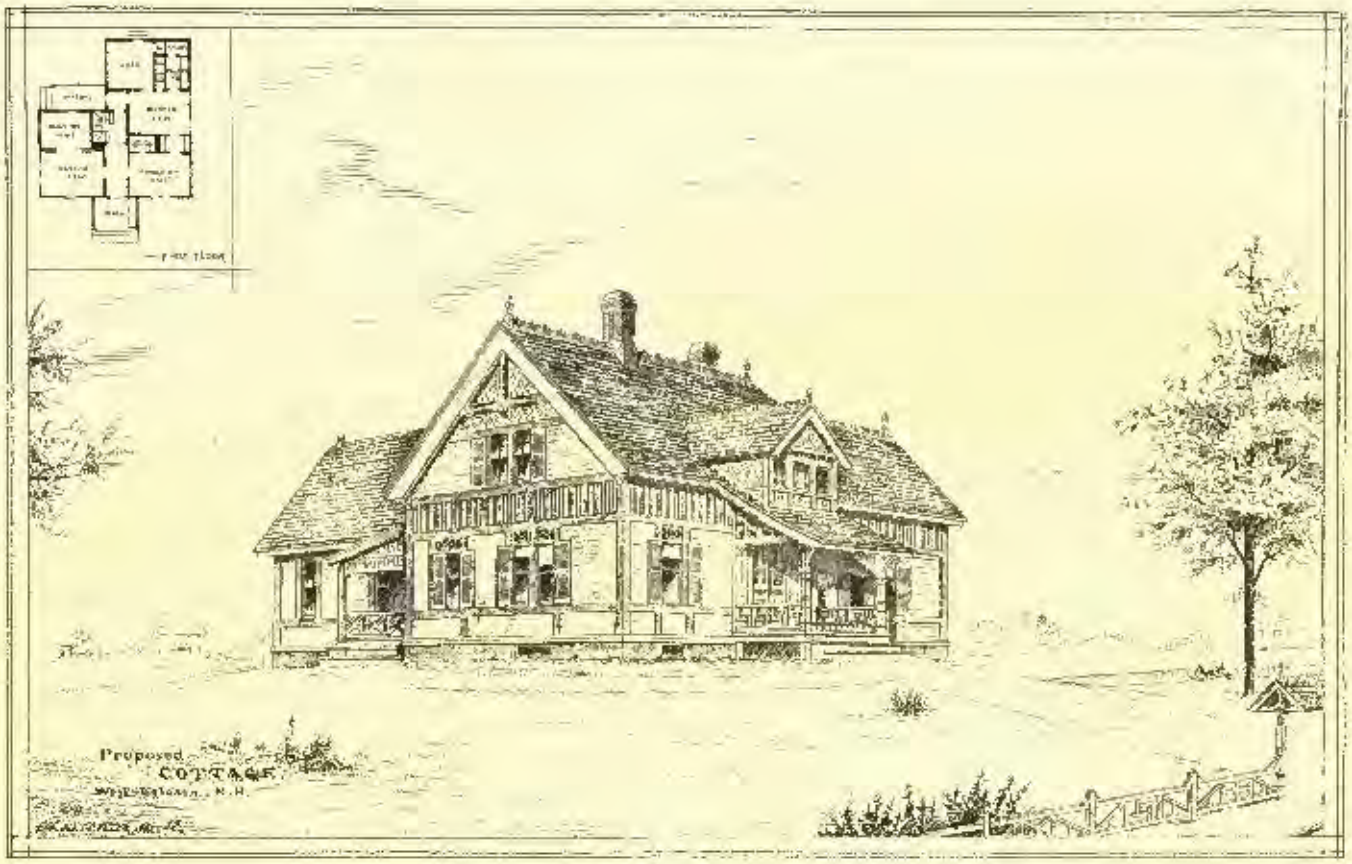
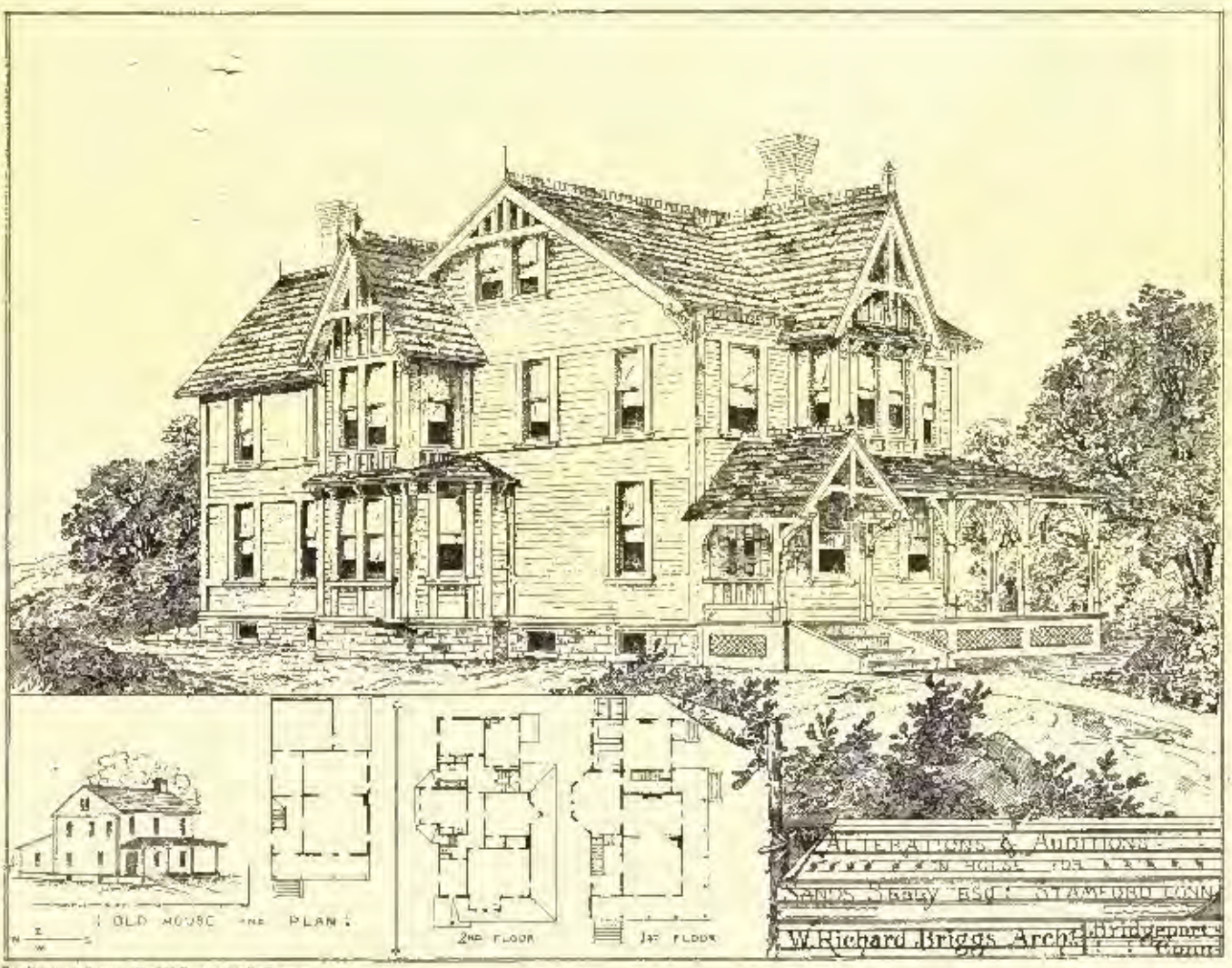


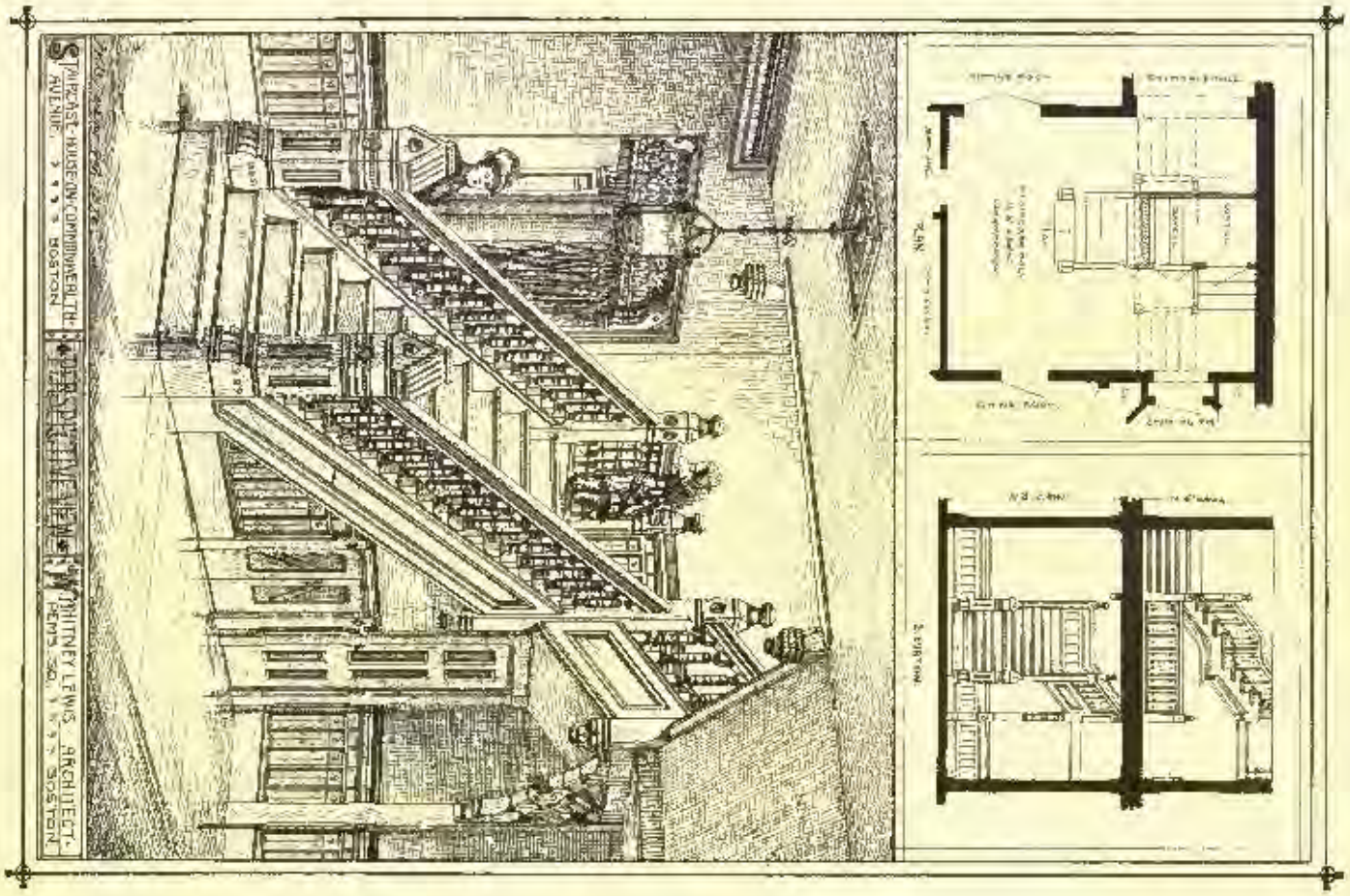
FIG. 69 (COPIED FROM HERLMAN'S CURVILINEAR PERSPECTIVE.)

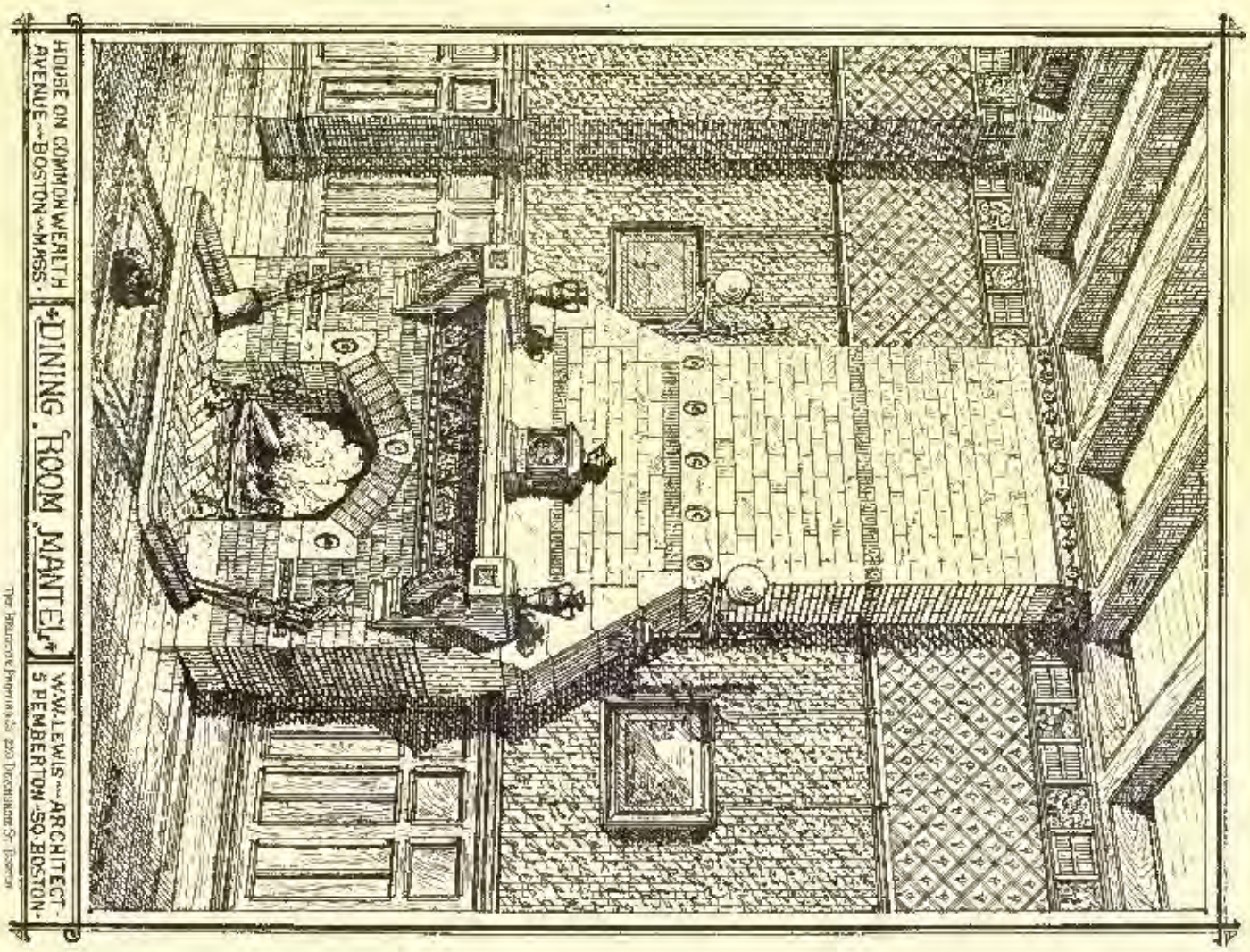
THE HELIOTYPE PRINTING CO. 240 Devonshire St. Boston.





THE HELIOTYPE PRINTING CO. 220 DEVONSHIRE ST. BOSTON


STAIRCASE-HOUSE ON COMMONWEALTH AVENUE, BOSTON
W. W. LEWIS, ARCHITECT, 5 PEMBERTON SQ. BOSTON
PLAN


HOUSE ON COMMONWEALTH AVENUE ~ BOSTON ~ MASS.
DINING ROOM MANTEL
W.W. LEWIS ~ ARCHITECT ~ 5 PEMBERTON SQ. BOSTON ~

282. Whether in any given case plane or cylindrical perspective is to be preferred is a matter of judgment, and one's decision must depend chiefly upon the nature of his subject. For architecture, except in picturesque sketches, the latter is in general obviously unfit. But for the landscape painter it affords the same means of escape from the inevitable distortions of plane perspective that the painter of figures finds in the corrections described in the previous paper.

The next paper will show how drawings in Curvilinear or Panoramic Perspective may be geometrically constructed.

THE ILLUSTRATIONS.

ALTERATIONS IN HOUSE FOR SANDS SEELY, ESQ., STAMFORD, CONN. MR. W. RICHARD BRIGGS, ARCHITECT.

THIS alteration was completed a year ago, at a cost of about $3,000. The old roof was not altered, nor were the windows or doors moved, the additions being put on with as little change as possible.

DESIGN FOR A COUNTRY HOUSE. MR. R. G. KENNEDY, ARCHITECT, PHILADELPHIA.

STAIRCASE, HALL, AND FIREPLACE IN A HOUSE ON COMMONWEALTH AVENUE, BOSTON, MASS. MR. W. W. LEWIS, ARCHITECT, BOSTON.

COTTAGE AT W. LEBANON, N. H. DESIGNED BY MR. C. A. RICH.

This cottage, to be built this fall for Mr. C. B. Drake, is situated on one of the terraces of the Connecticut River, overlooking it, with a western view up the White River. It is to be finished inside with pine throughout, and painted on the outside in party colors, with red roof. Estimated cost, $1,500.

STUDY IN PERSPECTIVE. PLATE XIV.

See "Paper on Perspective," in this number.

VERNACULAR ARCHITECTURE. V.

"HOUSE-PLANS FOR EVERYBODY," by S. B. Reed, Architect,[1] a collection of designs for cheap houses, mostly rural, published in the *American Agriculturist* during the last three years, is the latest exposition of the Vernacular Architecture presented to us in form for notice. If additional proof were needed that our popular fashions of building have been crystallized into a recognized and characteristic style, based upon contemporary manners and customs and upon our natural resources of material, this volume comes with a stamp of legitimacy upon it which cannot be denied. It distinctly sets forth the way in which we, in the Northern States especially, plan and build the simpler sorts of country houses, farm houses, and what, for the want of a more convenient term, we must call "suburban villas." There is nothing in it from beginning to end indicating that the author has ever indulged himself either in the reproduction of foreign forms or in the dangerous play of original invention. We have here what the profession is prompt to stigmatize as "carpenter's architecture," but what the profession must needs respect (to present an almost self-evident analogy) as a dialect which, although it may be vulgar, contains the vigorous roots of pure language. We still insist that the business of the architect is to accept these conditions, and devote himself to the proper and harmonious development of the elementary style thus furnished to him, so far, at least, as relates to his less monumental and more domestic works. Contempt for the present vulgarity of it, and especially for the crudeness of its more ambitious manifestations, is a natural feeling for the scholar familiar with higher types of architectural forms and accustomed to work in what may be called the ideal regions of design, but out of such contempt no direct contribution to the progress of American domestic architecture can possibly be developed.

The designs in this book are the commonplace results of adapting machine-made double-hung sashes, machine-made doors and blinds, machine-made mouldings and details, to elevations which, for the most part, pretty readily grow out of plans adapted by experience and observation to the needs of frugal country people, who do their own household work, sometimes perhaps with the assistance of a single servant, and whose habits of living are adjusted to a very small scale of expenditure. The text and the wood-cuts clearly explain all the devices of economical construction, with which, by the bye, architects of education would do well to make themselves more familiar. Of course the quality of the designs is best where there is the least attempt at adventitious or superficial ornamentation, but, although none of the designs are free from the usual illiterate detail, the book has fewer offences of wild jig-sawed brackets, gingerbread vergeboards, gorgeous but cheap dormers, bastard mansards, top-lofty finials, and the other peculiarities of our more ambitious vernacular, than most of the works on the subject. The costs range from $200 to $8,000, and those architects who desire to know by what mysterious processes carpenters are able to produce houses far within what seem to be the lowest limits of expense, will find in this book much to enlighten them.

[1] *House-Plans for Everybody, for Village and Country Residences, costing from $200 to $8,000, including full Descriptions and Estimates in Detail*, etc. 175 Illustrations. By S. B. Reed, Architect. New York: Orange Judd Company.

In each case the estimates are given in detail, and seem to be honest enough. It may be interesting, in view of the question of economy, to present one of these detailed estimates in full. It relates to a farmhouse 45′ 6″ x 30ft., in two stories and a roof.

The following estimate has been carefully compiled, and may be relied on for quantities, etc. Prices vary in different localities, but the figures here given form a good basis of calculation:—

65 yards excavation, at 20c. per yard	$13.00
882 ft. foundation, at 15c. per ft.	132.30
725 ft foundation, at 10c. per ft.	72.50
6,000 bricks in chimneys, at $12 per M.	72.00
40 ft. stone steps and coping, at 30c. per ft.	12.00
900 yards lath and plastering, at 28c. per yard	252.00
4,799 ft. of timber, at $15 per M.	72.00
Sills, 4x8 in. 218 ft. long. / 1 girt, 4x8 in. 20 ft. long. / 7 posts 4x7 in. 22 ft. long. / 2 posts 4x7 in. 18 ft. long. / 45 beams, 3x8 in. 16 ft. long. / 22 beams, 3x8 in. 22 ft. long. / 15 beams 3x7 in. 9 ft. long. / 4 valleys, 3x8 in. 20 ft. long. / Ties and plates, 4x6 in. 384 ft. long.	
500 wall-strips, 2x4 in. 13 ft. long, at 11c. each	55.00
340 novelty siding boards, 9½ in., at 28c. each	95.20
150 lbs. tarred felting, at 5c. per lb.	7.50
300 matched flooring boards, 9½ in. wide, at 28c. each	84.00
20 rough spruce plank, at 25c. each	5.00
270 shingling-lath, at 6c. each	16.20
48 bunches shingles, at $1.50 each	72.00
75 hemlock boards, 10-inch, at 18c. each	13.50
7 squares of tin roofing, at $9 per square	63.00
Materials in cornices and outside casings	50.00
33 narrow pine flooring for front piazza, at 25c. each	8.25
67 narrow pine ceiling, at 25c. each	16.75
1 bay-window, complete	75.00
26 plain windows, complete, at $12 each	312.00
4 cellar windows, complete, at $6 each	24.00
30 doors, complete, at $10 each	300.00
Stairs, complete, $70; 8 closets, fitted complete, $40	110.00
2 marble and 2 pine mantles	50.00
Nails, $20; range, with elevated oven, $80	100.00
Plumbing, $84; carriage, average 1 mile, $27 08	111.08
Carpenter's labor, not included above	250.00
Painting	120.00
Incidentals	25.72
Total cost, complete	$2,000.00

The questionable element in such estimates must always be the item of labor, which is obtained by "guesswork" and not by calculation, and varies in different localities enough to affect the total cost materially. But the other items, though in some cases ranging far below what is required by the higher class of work with which architects are more familiar, seem to be fairly considered.

The wood-cuts, worn by hard service in the *Agriculturist*, are coarse and badly drawn; the details are in all cases slurred over by the engraver, who is utterly destitute of sympathy for architectural forms; and the original conception of the architectural forms, except when confined to the simplest and most familiar developments, is, as we have already intimated, crude and illiterate. But common sense and practical experience lie at the root of them, and these make the value of the book not only to the prudent farmer, tradesman, or mechanic, who requires sound advice in the building of his modest homestead, but to the architect, who seeks to know the devices and appliances of cheap construction, and the true basis of style in our rural or suburban domestic architecture.

CORRESPONDENCE.

BUILDING NOTES. — FIRES.

ST. LOUIS.

DURING the half year ending July 1, 1878, 933 building permits were issued. The aggregate valuation of the improvements was $1,876,798. An equal activity for the second half year would yield something over 1,800 permits, less than for several years past, the number in 1877 being 2,115; in 1876, 1,825; in 1875, 1,973.

Of the 933 permits, 228 were for frame buildings. This is about twenty-five per cent of the whole number. Their aggregate valuation, however, was but $42,718, less than four per cent of the whole valuation. This comparison shows the insignificancy of frame building in St. Louis, where the cheapness and excellence of the bricks, and the comparative dearness of wood, combined with wise fire regulations and a popular prejudice for once in the right, have almost totally excluded frame houses within and without the city limits. The frame permits are usually for sheds, stables, frame kitchens, and like accessories to other premises. Four only of the 228 reached $1,000 in value, and their average was but $200 apiece; while there were forty under $25 each, three for $10 each, and one for $5.

Just across the river, however, in East St. Louis, where there is no brick clay, and the only foundation is river alluvium of unknown depth and doubtful consistency, frame houses are more popular, and quite outnumber their more substantial-looking brick rivals.

Most of the 705 brick buildings erected this year are, of course, dwellings, generally small, of but six or eight rooms, and built either singly or in blocks of three or four. The long blocks of dwellings so common in other large cities are rare here, and large houses are generally in poor demand among renters, save in the narrow and select

district most affected by the wealthy few who have not yet built for themselves, though usually hoping to do so at some time. The small houses are most wanted and pay the best return on their cost.

Early in the spring three fine three-story houses of twelve or thirteen rooms each were finished and offered for rent. They cost with ground $8,000 each. They have handsome fronts of stone ashlar, slate roofs, furnace heat throughout, a concreted and plastered cellar, hot and cold water from cistern and hydrants on two floors; front, side, and rear yards paved, sodded, and inclosed by a wall of dressed stone, and every appointment without and within of a first-class dwelling for a family of moderate means. They stand on a well-shaded avenue, in an excellent neighborhood, once as fashionable as any, and near our finest park; are convenient to street cars, and but twenty minutes' ride from the court-house. These most attractive houses were offered for several months at $780 a year, without success. The rent was then lowered to $660, and one was taken. About a month later a second was occupied. The third is still vacant.

In the fashionable "West End," inferior houses are sought eagerly at higher rents; but elsewhere no excellence of accommodation or cheapness of rent will persuade people to take large houses. They do not need the rooms, and they do not want to furnish them nor to hire extra servants to keep them in order. They will pay as high or higher rents for a smaller house.

In notable contrast with the above may be mentioned a row of eight small brick tenements, for two families each, in suites of three rooms on a floor, which were built about the same time. Each family is completely isolated from all the others, and there is liberal provision of separate closets, coal-boxes, water-closets, balconies, etc., for each. The ground was cheap and the entire cost of ground and houses hardly exceeded $800 to a family. These houses were all taken as soon as finished at $12 a month each, and have continued fully occupied ever since. After deducting all expenses they are yielding a net return of about fifteen per cent on the investment. Moreover, as the rent is low for the accommodation given, the above income may be expected to be tolerably permanent. These two illustrations show the necessity of adapting improvements to the neighborhood in which they are to be placed if satisfactory results are to follow.

A moderate amount of building usually continues through the winter, the cold weather seldom occasioning any prolonged interruption of such work. Last winter was so mild that hardly a day was lost.

This city ought to be a favorite with fire-insurance companies. In the six months from January to June, inclusive, the entire loss by fire was but $159,013.70, and the loss to insurance companies was only $132,930.04. There are many single companies that could carry the whole loss without assistance or great inconvenience.

CESSPOOL VENTILATION.

Boston, September, 1878.

To the Editor of the American Architect:

Your correspondent "V." in last week's paper (August 31), brings to notice some questions in sanitary science which deserve a careful answer, being of general importance, and covering points on which a general misapprehension seems to prevail. I submit the following reply: The trouble complained of arose from ventilating the cesspool through the house drains and through the special pipe outside the house, attached to the house and "carried up above the roof." Experience has shown in hundreds of cases within my notice that human workmanship is too imperfect in its nature to justify us in inviting into or even near to our dwellings the foul products of decomposing sewage, through *pipes* of any kind whatsoever. The cardinal principle in the removal of offal by water carriage, is to get it carried off *at once* from our houses, as far as possible, without giving any time for putrefaction, and having done so, to exclude by all means in our power the return of the gaseous products of its decomposition to the neighborhood of our houses, either through the drains or any other pipes. Cesspools are at best but poor substitutes for sewers, because they keep the filth too near our houses during its decomposition. They should, therefore, be guarded with more jealousy than sewers, and should be located as far as possible from the houses. When houses are too much crowded to admit of the cesspool being removed at least one hundred feet from them, and where no sewers are provided, the system of "water carriage" is of very doubtful propriety, and might often be abandoned with gain, and substituted by some system of daily removal by hand, such as is practiced in Rochdale and many other English towns with success. At any rate the cesspool vent should never come near the house, and its gases should be cut off from the house by a trap in the main drain outside the house, with a vent-hole close to the trap on the upper side of same, that is, next the house in the same way as if connecting with a sewer. With such a vent hole, opening in a well or man-hole with perforated cover, close to a house, either in front lawn or back yard no offense is likely to occur, for the heat of the house, whether by fire in winter or by sunshine on the roof in summer, is sure to keep a constant draft of air outward by the soil pipe which passes up through the roof, drawing the air *inward* at this vent-hole near the trap. The only chance of an outward draft occurring near the trap is from slight puffs of air pushed forward by columns of water descending the soil pipes. These are only instantaneous in their nature, to be sucked back again by the constant draft in the next instant. The walls of the man-hole should be laid in stone without mortar up to within two feet of the surface, like a well lining, so that any such puffs of air from the drain would come in contact with the earth, whose absorbent and purifying powers are well known to be efficient within such limited quantity as may here be required. Such a system has been applied with perfect success in a large number of cases by myself. With such a protection the air in the house-drain can never become very foul, for though a certain amount of decomposing slime always adheres to the inside of such pipes, the constant current of air established by this arrangement would effectually prevent any such concentration of poison as must always exist in the air chamber of a cesspool and its vent pipes.

In England, and other climates of less rigor than that of Boston, it is easier and more sure to make the disconnection between the house and sewer or cesspool by allowing the drain to be quite open for a foot in length, just inside the main trap, and to introduce the waste water from bath-tubs, sinks, rain-spouts, etc., by an open delivery over this point. Such a system is made compulsory in many European towns where the local authorities have taken the pains to study the best methods, and it is to be hoped a similar one may be made so here and adapted to local circumstances.

Edward S. Philbrick.

To the Editor of the American Architect:

Dear Sir,— Your correspondent "V.," who complains of a smell from the pipe which ventilates his cesspool, would do better to carry the pipe higher, so as to give the utmost possible freedom of diffusion in the surrounding air. In still nights the gas, diffusing itself in all directions, reaches the roof before it is much diluted, and the mixed air creeps along the surface of the roof and walls to the ground. The remedy is to have the mouth of the pipe farther from the roof, so that the escaping gas may be more diluted before it reaches the surfaces over which it creeps, and also that the chances may be greater of its being swept away by a current of air.

It is hard to explain why the smell should be strongest at the base of the pipe. Perhaps the air is more stagnant there, so that the gas from above makes a more sensible impression, or possibly a mixture of different gases may, by some interpenetration of their atoms, be occasionally heavier than either separately.

Common illuminating gas, escaping into a room, will travel a long distance, and descend considerably below its source, clinging close to the walls, so that the smell will be quite strong two or three inches from the wall, while it cannot be detected at a greater distance. The whole subject of the diffusion and conduction of gases needs scientific investigation. Whatever may be the reason, it is a common experience to find the smell from open soil pipes descending or ascending into chamber windows in warm, damp weather.

It is doubtful whether the charcoal would be of service; some sanitarians think it useless even when applied much more thoroughly than your correspondent purposes. The covering of oil over the contents of the cesspool might do good, — I think it is sometimes used for similar purposes, — or a little sulphate of iron, in powder or in solution, thrown into the cesspool occasionally, will do much toward keeping down the smells.

Does your correspondent notice whether any stench descends from the open soil pipe? If not, that is an indication that a similar situation for the ventilating pipe would be satisfactory.

Your correspondent does not say whether there is any overflow or other possible source of air to the cesspool except the two pipes. If not, one of the pipes, naturally the longest and warmest, should act as the outlet, and the other as the inlet, and the inlet flue, which in this case is probably the ventilation pipe, might with advantage have its area contracted to that of the soil pipe, which is likely to act mostly as outlet. If, on the other hand, there is some access for air to the cesspool besides the two pipes, both of them act as withdrawing shafts, which is of little advantage, as one answers all purposes of preventing the accumulation of gas under pressure, and a dozen would not make the cesspool sweet, and the two shafts convey an unnecessary amount of the cesspool air to the roof of the house. In this case the ventilating pipe might as well be closed entirely. If the joints of the soil pipe leak, the additional pipe will not help them much; but they are not likely to leak if the work was properly done.

T. M. C.

THE DWELLINGS OF THE POOR.[1]

The question before us to-day is so complicated that it will be impossible to consider it now in all its different aspects. Sewerage, ventilation, lighting, heating, the avoidance of dampness, the necessary number of rooms, the cubic space that should be allowed for every individual, and the disposition of the kitchens, are all points which must be decided, but which cannot be treated simultaneously and satisfactorily in the course of ten short minutes. Such a summary would allow only a minute for each problem, though these problems have been discussed for years, and are not yet solved! Permit me, then, to confine my remarks to only one of these questions, to that which is most familiar to me, and which was the starting point of an important enterprise that I have been fortunate enough to render successful.

[1] A Paper read by Mr. Thomas Griffiths, at the International Congress of Hygiene in Paris.

If there be one thing that is a special grievance to us in England, that one thing is the dampness of our climate; and it may be conceived with what energy we have sought to overcome this common enemy. Diseases of the chest, rheumatism, etc., are disproportionately frequent in our little island, surrounded as it is with currents of warm air, coming from the Gulf of Mexico and from the tropics, condensing on our cold coasts, and falling on our dwellings in the shape of fine rain or dense fog. This incessant moisture makes its way at last through the most solidly constructed walls, whilst persons who inhabit the cheap little houses run up by greedy speculators, are constantly exposed to the fatal effects of our climate. From day to day we see rising from the earth, like clusters of fungi, groups of little houses, built up with extraordinary rapidity on waste lands, in the marshy districts that surround great towns. These dwellings are inhabited, before even they are properly dried, by our poor trading classes, laborers, and needy families. The same might be said, possibly, not only of all the great English centres, but of all the centres of Europe; and in all countries more or less suffering is caused by damp.

What have we done to avert these dangers? In the houses of the poor, very little; in the palaces of the rich, very much. The results are, however, more equalized; for neither the poor nor the rich have, as yet, succeeded in protecting themselves effectively against damp. However, I hope to show you that there is one thoroughly efficacious means which can be employed, as easily for the poor as for the rich. I allude to the superficial putrification of the interior or exterior coatings of the wall. This petrifaction is consolidated, rather than weakened, by the contact of water and damp; it protects not only the health of man, but the durability of the dwelling. It has often been remarked that the mortar or cement of old castles, etc., had become as hard and solid as stone. The remarkable fact is due to the action of time; in mixing the silex of sand with lime, a silicate of lime is produced quite naturally. But this has taken many years — even centuries. Happily, we have now a liquid which will give to our walls, in a few days, that which it has hitherto required centuries to accomplish.

This preparation, the petrifying liquid, is a solution of a silicate, the use of which may be intrusted to the most inexperienced workmen. It sinks into the walls, like water, with the greatest rapidity, but after a few hours the water with which the silicate is mixed evaporates, and a petrifaction takes place, so that the wall is soon covered with a thick coating impenetrable as stone. The walls may then be washed with water. Should there have been contagious diseases or other infections, the walls may be exposed to the most destructive fumigations, or washed with strong antiseptics, without in any way affecting the surface.

The liquid is generally mixed with coloring matters that are not poisonous, or it is used in its simple state for the first coating, to which is added the silicate paint manufactured by the same company. The principal constituent of the paint is obtained from a natural source, and is very pure, and appears to be produced by a volcanic action which must have desolated the country in prehistoric ages. With this silex the Silicate Paint Company of London and of Liverpool manufacture the petrifying liquid of which I have already spoken, and the silicate paints, and also an enamel paint. All these manufactures have an important hygienic significance. The first protects us from the damp that penetrates our walls, the second forms a paint that resists all climates and contains no poisonous matter, and the third furnishes a very cheap enamel that resembles porcelain, and has the same advantages as regards cleanliness. Here we have, then, an easy means of improving the health conditions of the poorer classes.

Dr. Du Mesnil, in his report to the Congress, gives us in a few powerful phrases a summary of the causes that ruin the health of the poor; and unfortunately we must all agree as to the truthfulness of his picture. The sun's rays, he says, do not always reach the narrow streets, which are thus deprived of the natural purification and disinfection provided by Nature in the light of the sun. The staircases are dingy and dirty, and much used; and if germs of disease were to fall there, germs which live on impurity, they would find there a breeding place, and grow and develop.

Is it not, therefore, desirable to wash and cleanse these staircases once for all, and to cover them with a coating of paint or enamel which would not offer the same facilities for the accumulation of dust and dirt, and which, on the other hand, would be much more easy to wash and to keep in a state of proper cleanliness? Dr. Du Mesnil adds that the tile roofs often let in damp and moisture, but the petrifying liquid to which I have alluded is a certain remedy for this. Finally, the learned reporter complains of walls that are covered with torn paper.

This final detail is undoubtedly most important, and I should like to make a few observations upon it. Wall-paper is often dangerous, and especially in the houses of the poor, where it facilitates the disguising of a false plaster wall from which it does not exclude the humidity, while it attracts dust and vermin, and the damp encourages the detachment of particles of coloring matter, containing, very often, arsenic or copper. Green wall-papers are not alone in their arsenical effects; the finest brown tints often contain arsenic. There is also the danger of accumulations of wall-papers to be guarded against. How often has it been remarked, that not one or two layers, but twelve, thirteen, fourteen, twenty, and, in one special case, twenty-five layers of paper have been found placed one over another! In the last-mentioned case the family inhabiting the house had often noticed a disagreeable odor; and finally, as a natural consequence, typhoid fever set in. It was then only, and after vain examination of all the causes that might have produced the odor already mentioned, that the twenty-five layers of paper on the wall were discovered. The paste in a state of putrefaction caused emanations that had poisoned the blood of the family. In order to avoid all these accidents and inconveniences, we must have our walls painted, and painted with a composition that is at once economical and harmless.

The paints manufactured by the Silicate Paint Company have been frequently analyzed by scientific men; among others, Professor Flageolet, of Paris, who declared that the sample he examined contained 78 per cent of pure silex, 13 per cent of water, 3 per cent of oxide of iron, 4 per cent of alumina, and 1 per cent of manganesia. The material is, it will be seen, thoroughly unique, and the silica, which is almost pure, can, when calcined, and reduced to powder, be employed in many ways. The great railway companies and steam packet companies, the great manufacturing firms, and the Governments of England, Germany, Austria, Italy, Spain, Russia, and Egypt, use this silex paint for the better preservation of their ships, arsenals, etc. In the hospitals, the workhouses, the refuges, and primary schools of England, a large quantity of this preparation is employed, for the purpose of keeping the walls free from damp, by using it as a hygienic substitute for wall-paper; and, finally, as a means of insuring cleanliness, and lessening the risks of contagion.

Had I the time, I might allude to several other questions raised by the report which we have read with so much interest; but I will content myself with that which I have already said, for I know that in your hands all that concerns the well-being of humanity will receive the attention it merits. If I have confined my remarks to one detail, it is because I am convinced that the detail is important. Finally, let me thank you for your patience, and beg of you, if I have spoken to you at too great length on one subject, to excuse the enthusiasm of a specialist.

ST. ALBAN'S NAVE.

MR. NEALE'S accurate measurements settle the controversy as to the relative lengths of St. Alban's and Winchester Cathedral in favor of the latter. The extreme external length of St. Alban's "from the plinth of the buttress of the east wall of the Lady Chapel to the face of the buttress of the west porch" is 550 feet 1½ inches; while that of Winchester, measured between corresponding points, is 557 feet 9 inches, exceeding its Hertfordshire rival by 7 feet 7½ inches. This superiority, however, is entirely due to the eastern limb, the nave of St. Alban's exceeding that of Winchester in length by nearly nine feet — 284 feet 9½ inches, as against 275 feet 7 inches — while the effect of its length is much greater. "The repetition of the strong unbroken lines of precisely similar length at different levels in the nave and aisles at St. Alban's drives home to the imagination in a way quite unique the impression of length. The nave of St. Alban's is not only the longest in the kingdom, but the longest in the world." It was, however, surpassed by that of Old St. Paul's, which, according to Mr. E. B. Ferrey's drawings, must have been more than three hundred feet long, the entire length of the Cathedral being about five hundred and ninety-six feet, while it must not be forgotten that St. Petronius, at Bologna, is only the nave of the intended building, and would have incontestably been the longest Gothic church ever built. We of course exclude St. Peter's from the consideration. In the case of Old St. Paul's the effect of length must have been far greater, the main elevation of the building being maintained from end to end, as at York, Lincoln, and Worcester, without any comparation of long low chapels to the east, as at Winchester and St. Alban's, or of a galilee to the west, as at Ely and Durham. The gigantic conceptions of Abbot Paul, to whom we owe the vast and stern fabric which, in Mr. Freeman's words, "for size at least, if not for beauty, has remained the wonder of all succeeding ages," are well brought out by Mr. Neale by a comparison with the slightly earlier churches of his relative — some said his father — Lanfranc, at Caen and at Canterbury. The tables given, to which we must refer our readers, will show how vastly the scale adopted by Paul exceeded not only those ministers, — the dimensions of which, however, are to some extent conjectured, — but all contemporary buildings of which we have any knowledge, St. Paul's being the only exception. — *The Saturday Review.*

NOTES AND CLIPPINGS.

FOUNDATIONS FOR BRIDGES. — The system of making foundations for bridges in marshy soils, adopted by French engineers in the case of the Charentes Railway, a line which crosses a peat valley to the junction of two small rivers, seems to have solved the problem of what is required in such cases. The thickness of peat at this point was so great that any attempt to reach the solid ground would have been extremely expensive. In order, therefore, to obtain a good support for the bridge, two large masses of ballast, accurately rammed, were made on each bank of the river, and a third on the peninsula between the two. The slopes of these heaps were pitched with dry stones, for preventing the sand from being washed away by the rains or by the floods in the rivers. Over the ballast a timber platform was laid, this platform carrying the girders of the bridge, which has two spans about sixty feet each. When some sinking down takes place the girders are easily kept to the proper level by packing the ballast under the timber platform, — this platform packing being made by the plate-layers with their ordinary materials. In another case, that of a railway in Algiers, a differ-

ent plan of engineering was resorted to. The road crosses a peaty plain nearly a mile broad, the floods and the elasticity of the ground preventing the formation of any embankment. The road was to be carried over a viaduct across the valley, but the foundations of this viaduct presented serious difficulties, the thickness of peat or of compressible ground being nearly eighty feet. It was quite possible to reach the solid ground with cast-iron tubes sunk with compressed air, or any other system; but neither the implements, the workmen, nor the material for such an undertaking were accessible in that region. Under these circumstances the engineers began boring holes ten inches in diameter down to the solid ground; these holes, lined with thin plate iron pipes, were afterwards filled with concrete up to the very level of the ground. Each of these concrete columns bears a cast-iron column, these columns being braced together in a suitable manner, thus supporting the girders of the viaduct.—*Railway Review.*

Hints on Varnishing.—Cassell's *Household Guide* gives the following direction as to varnishing: "Before beginning to varnish it is necessary that the surface to which it is to be applied should be perfectly free from all grease and smoke stains, for it will be found that if this is not attended to the varnish will not dry hard. If the varnish is to be applied to old articles, it is necessary to wash them very carefully with soap and water before applying it. When it is wished that the varnish should dry quickly and hard it is necessary to be careful that the varnish should always be kept as long a time as possible before being used; and also that too high a temperature has not been used in manufacturing the varnish employed. It is likewise customary, when it can be done, to expose the article to the atmosphere of a heated room. This is called "stoving" it, and is found to greatly improve the appearance of the work, as well as to cause the varnish to dry quickly. After the surface is varnished, to remove all the marks left by the brush it is usually carefully polished with finely-powdered pumice-stone and water. Afterwards, to give the surface the greatest polish it is capable of receiving, it is rubbed over with a clean, soft rag, on the surface of which a mixture of very finely-powdered tripoli and oil has been applied. The surface is afterwards cleaned with a soft rag and powdered starch, and the last polish is given with the palm of the hand. This method is, however, only employed when those varnishes are used which, when dry, become sufficiently hard to admit of it. When it is wished to varnish drawings, engravings, or other paper articles, it is usual to previously paint them over with a clear solution of gelatine. This is usually prepared from parchment cuttings."

Natural Gas Supply.—It is said that the town of Fredonia, in Chautauqua County, N. Y., has been supplied during the past fifty-two years with natural gas, which finds its source between two large coal measures.

The Decoration of St. Paul's.—It is said that the dean and chapter of St. Paul's have entertained the idea of abandoning the use of mosaics for the new decorations and substituting in their stead hand-painted tiles.

Ventilating Fans.—Messrs. Verity Brothers, of London we believe, have invented and patented a very clever and simple apparatus for inducing currents of air in a building. A tank of any desired size is placed at the top of the building, and from it the water is led to the apparatus by a ¾-inch pipe. The apparatus consists of a fly-wheel, with sets of fans on either side of it, and attached to the same axis with it. This axis is journalled on jewelled centres, so that the system revolves on the application of the slightest force. Upon the fly-wheel two or more fine jets of water from the tank are directed through two pin-holes, and thus cause the fans to revolve rapidly. It is said that a current of air can thus be created having a velocity of one thousand feet or more per minute. It is evident that, as the head of water and the number of jets can be regulated at will, almost any degree of velocity can be obtained. The waste water is made to pass in a thin sheet over the inlet for fresh air, and so wash from the air the impurities contained in it. As the same method can be applied to supply and to exhaust fans, the ventilation of a building is thus made a very simple thing.

Ship-Canal.—The bill authorizing the Barataria Ship-Canal Company to construct a canal from New Orleans to the Gulf of Mexico, and granting the right of way for that purpose, has become a law.

Absorption of Carbonic Oxide by Living Organisms.—N. Gréhant has experimented with mixtures of air and minute portions of carbonic oxide. He finds that a man or an animal, when compelled for a half hour to breathe an atmosphere containing only $\frac{1}{1000}$ of carbonic oxide, absorbs that gas in sufficient quantities to saturate about half of the red globules of the blood, so that they become incapable of absorbing oxygen. In an atmosphere containing $\frac{1}{2000}$ of carbonic oxide, about a quarter of the red globules are similarly saturated. These results are interesting and important in relation to physiology and hygiene.—*Comptes Rendus.*

Dynuts.—If there were nothing else to mark the skill, genius, and artistic workmanship of the Japanese, the great bronze statue of Dia Bootzu would be sufficient to make their name imperishable. Dia Bootzu would be worthy of a place among the wonders of the world, equally so with the Colossus of Rhodes, Cleopatra's Needles, or the Sphinx of Egypt. This sacred image was not only built of bronze, but the joints were so exact in their fit that they were barely perceptible to the closest observer. Its base rested on a dais of masonry about 5 feet in height. The elevation of the body was 5 jins or 50 feet; between the edge of the hair of the head and the legs crossed, 42 feet; from knee to knee, seated cross-legged, 36 feet, and the circumference of the body was 98 feet. The following were the minor dimensions: Face, 8¾ feet long; circular spot on forehead, 1½ feet in circumference; eyes, 4 feet long; eyebrows, 4 feet 2½ inches; ear, 6 feet 7 inches; nose, 3 feet 9 inches vertical and 2 feet 4 inches horizontal measurement; mouth, 4 feet 3½ inches wide; shaved portion of head on top called *bik kokee*, 2 feet 4 inches in diameter. The spirally curled locks of hair on the head were 9½ inches wide and 330 in number; each thumb measured 3 feet in circumference. These figures will convey some idea of the dimensions, if not the magnificence, of this almost superhuman exhibition of Japanese art. The interior of the statue formed a beautiful temple in which were gilt images of Buddhist saints, with crosiers and glories and other appropriate objects of worship or reverence. In front and at the foot of the statue was an altar on which were incense pots and urns to receive the votive offerings of visitors attracted thither by sentiments of religious fervor or curiosity.—*Philadelphia Press.*

The Real Inventor of the Telephone.—An article in a recent number of the Pekin *Gazette*, written by Chin Hoo, says Kung Foo Whing, a distinguished philosopher who flourished about the year 976, invented the telephone, which is known in China as "Thumthseiu," in the year 968.

Archæology in Palestine.—The remains of a large and magnificent church, built of unusually great stones, has been observed at Amwas near 'Ain Shusheh, in Palestine. It dates probably anterior to crusading times, and possibly from the fifth century.

How to smuggle Pictures out of Italy.—Referring to the mischance of an English collector in having a picture by an old master, acquired in Italy, taken from his agent by the Italian customs officials at the frontier, and placed in one of the government picture-galleries, a correspondent of the *Pall Mall Gazette* says that venders sometimes suggest a way to evade this unpleasant difficulty, a difficulty which is countenanced by a law which prohibits any work of art being taken out of the country without the express permission of the government,—a permission rarely granted; while the government arrogates to itself the right of buying the work of art in question, but only at two thirds the purchase price. The way of evading seizure is to have a modern painting painted over the work of the old master, with the knowledge that modern work can be cleaned away by careful hands, and leave the masterpiece unhurt. "The suggestion," he says, "is ingenious, but my advice is, do not avail yourself of it. Some five and twenty years ago a traveller picked up a veritable gem from a well-known gallery, whose owner parted from it with tears and only for a very considerable consideration; and that it might be safely smuggled out of the country, a modern landscape was painted over it. 'When you get it to England, any picture-cleaner with a light finger will remove the veil of the modern painter, and reveal the beauties which it conceals.' The plan succeeded admirably up to a certain point. The picture-cleaner had not a 'light finger.' He removed the modern landscape, but in doing so unfortunately rubbed out at the same time the old master; and the purchaser, when the picture was cleaned, found that all he had really got to adorn his gallery was the portrait of a general officer of the time of George I. in full uniform."

Disinfectants and Deodorants.—Mr. Thos. Taylor, Microscopist of the Department of Agriculture, gives the following in the Washington *Evening Star*: "During the year 1876 I made a series of experiments with essential oils, including the oil of eucalyptus globulus and the spirits of turpentine, which were published in the report of the Department of Agriculture for that year. I found that the oil of eucalyptus disinfected fresh meat as effectually as carbolic acid, besides being a powerful deodorizer, and on combining it with soap found it agreeable, forming a valuable substitute for the carbolic, especially for the sick room. Turpentine I found to be also a most powerful deodorizer. A tablespoonful of the latter, added to a pailful of water, will destroy the odor of cesspools instantly, and in the sick chamber will prove a powerful auxiliary in the destruction of germs and bad odors, being both a disinfectant and deodorizer. I have quite recently added to the list of disinfectants one of general application, and it has for many purposes the advantage of cheapness with remarkable effectiveness. I allude to gasoline, one of the products of petroleum. Gasoline when applied to the germs of fungi or of other cryptogamic plants instantly destroys them, although it fails to deodorize gases. Being a solvent of oils and fats it destroys animal germs and fatty degeneration gives way to it. It may be employed full strength to wash delicate and tender plants and sores without producing pain. It is wholly devoid of the caustic principle; even when applied to the tongue it produces no disagreeable sensation. A single drop applied to any insect will kill it, and even its vapors have a most destructive effect on the lower forms of animal life. When gasoline is applied to a wound or to any delicate part of the body, on evaporation it produces a sensation of cold, followed soon after by a sensation of heat. Of course all experiments should be made in the absence of artificial light, as it is a very explosive gas."

Accidents from Machinery in France.—The French government has upon several occasions since the alteration of the laws regulating the use of steam engines published statistics of the accidents which have been caused by them each year. The returns, very carefully prepared, like all the statistical work done by the French Government, but not brought down to date, deal with the four years between 1873 and 1876 inclusive; and from them it appears that there were 121 accidents (30 in 1873, 32 in 1874, 24 in 1875, and 35 in 1876), which resulted in the death of 145 persons, 193 others being more or less severely injured. Most of the severe accidents were due to the use of boilers which had no inner grate. Only three accidents were caused by the explosion of the boilers of railway engines, and in neither of these cases was there any loss of life.

It is worthy of note that there are fewer accidents in the very large factories than in the second and third rate establishments, though when they do happen they have more disastrous results than any of the others, because of the large number of people employed. At least one-fifth of the accidents have been due to the want of water in the boiler; but in many cases it has been impossible to speak positively as to the cause.

Of the 145 fatal cases, 14 are set down to defects of construction, 3 to the bad quality of the metal, 27 to excessive wear, 23 to corrosion of the sides of the boiler, 3 to over-pressure, 23 to the want of water, 14 to the carelessness of the stoker, and 6 to insufficient cleaning. The number of these accidents might, by increased care and watchfulness, be reduced; but the returns vary little from one year to another, and as upwards of 40,000 steam machines are at work, the bill of mortality is not so heavy as it is in some other countries.—*Hardware Reporter.*

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CONTENTS.

SUMMARY: —
The Experts in the Patent Office Competition. — Competition Programmes. — The Spinola Scheme for Heating New York. — Sub-ways in Cities. — Opposition to the Elevated Railways in New York. — The Cost of Roads. — Roman Sculpture Found at London and at Rome. — The Art Interchange . 105

MR. RUSKIN'S DRAWINGS. — DORÉ'S PICTURES 107

PLANTING TREES 108

THE ILLUSTRATIONS: —
Proposed Church at Sea Cliff. — The Château d'Amboise. — The York City Market. — House at Schenectady 108

THE PATENT OFFICE COMPETITION 108

CORRESPONDENCE: —
Wood Pavements in Chicago. — Letter from St. John . . . 110

AMERICAN INGENUITY 111

NOTES AND CLIPPINGS 112

A CORRESPONDENT, whose communication is in another column, criticises the report of the experts in the Patent Office competition, and apparently inclines to make it an issue with them that they practically limited themselves to considering which of the competitors most exactly carried out the instructions of the circulars, instead of deciding what was on its own merits the best project proposed; he intimates that they might in this last way have done the government better service. The text of the Report (*American Architect*, August 31st) shows that the course which our correspondent ascribes to them was what the experts deliberately accepted as their duty; and this was apparently what was expected of them; it does not indicate that they saw no reasons, on other grounds, for a different selection. Whether they might have chosen, among the submitted designs, one which was architecturally better, or preferable for its general merit, we have no means of judging; but we believe that the experts were right in taking the view they did of their duty. The position of referees in a competition is a very exposed one, and the only means of fortifying it against recrimination from competitors or interference from the authorities is a very scrupulous adherence to the appointed conditions. The government was bound, on its part, to the closest adherence to its stipulations, and must exact the same from its referees. The competition was an experiment, and might almost be considered a novel one, being contrary to the policy of the government for a score of years past. The standing reproach of competitions is a want of good faith in their managers. It was the more important, therefore, that the good faith of the department should be unassailable. This was what it owed to the profession as well as to its own position, and this maintained, it was left for the government to decide whether the experiment turned out to its own advantage, and encouraged repetition. Accordingly the department, having issued its final circular, abode by it; the experts held to the letter of their instructions, and decided, so far as we know, without suspicion of partiality; the Secretary kept his faith to them, and to the competitors, by adopting their decision. If, after this effort at fair dealing, the government makes an injudicious choice, this is to its own injury, and is one of the chances which the competitors are bound to accept. They cannot gracefully complain of it, though the right of criticism remains to them. The department has done its duty by the profession when it has shown them courtesy, fairness, and good faith, and there has been no complaint, we believe, that it has failed in these.

THIS brings up a question which is forever recurring in competitions: How far shall competitors be held to the exact carrying out of a programme, and how far shall they be allowed the liberty of modifying it? It is the very A B C of good faith that whatever condition is laid down shall be rigorously adhered to; therefore it is very desirable to lay down none that may turn out a mere impediment. The habit of careful business men is to fix beforehand as exactly as possible the details of every transaction; and this leads building committees to look with distrust upon an indefinite programme as something unbusinesslike, and to try to decide and declare pretty definitely from the beginning what they will have. But it is impossible for such committees to forecast the ideas that may be offered, and any unnecessary restriction may rule out some idea that would be valuable to them. In fact, they continually find themselves in the dilemma of being obliged either to disregard restrictions which they have imposed, or to give up the designs which please them most. The safe and reasonable way is to impose only such conditions as are essential to the success and fairness of the competition: as, for instance, the number and kind of drawings, uniformity of scale and rendering, and concealment of names; or such as are inevitable from the circumstances of the case — from the size of lot, perhaps, or the necessary accommodation, — and to give the rest of their instructions, the more fully the better, in the form, not of conditions, but of recommendations, by which they may afterwards be governed or not as experience may teach them. Our correspondent was doubtless right in arguing that the best result is to be got in competitions by following the spirit rather than the letter of the instructions; but this requires that the instructions be drawn accordingly. The circulars in the case of the Patent Office were worded with an evident desire to leave architects with as much freedom as was possible, while the needs of the government were duly indicated; though perhaps the instructions to the experts might with advantage have allowed a wider scope to their judgment. Architects are apt, indeed, to make the mistake of insisting that as a matter of justice to themselves the programmes should be very rigidly drawn and strictly adhered to, especially in regard to limit of cost. It is safe, however, to remind them that neither justice nor opportunity to themselves call for any more definite instructions to competitors than are directly needed to prevent any one from getting undue advantage over others, and save them from wasting labor by working in a wrong direction: and to say to those who offer competitions that anything more than this is less likely to turn out a useful restraint on competitors than a vexatious impediment to themselves. Among the great vices of well-meant competitions are too great rigidity of conditions, and, in consequence, too great laxity in enforcing them when they are found to be in the way.

THE Spinola scheme for laying pipes under the streets of New York for the general distribution of steam, according to the Holly system, which we have several times mentioned, makes its way slowly through the New York Board of Aldermen. The original resolution in its favor gave a pretty general and indefinite franchise to lay the pipes and make connections, as should be necessary for any purposes for which the steam distributed could be used, with the condition — which, considering the magnitude of the scheme, can hardly pass for anything more than a decent pretence — that bonds should be given in the sum of five thousand dollars to restore to good condition the pavements under which the pipes should be laid. A resolution of amendment was proposed in the Board of Aldermen increasing the bonds to fifty thousand dollars, and requiring an additional surety of one hundred thousand dollars to guarantee the city against injury to itself or to private persons from explosions or other misbehavior of the steam. It was also provided that the laying of pipes should be under supervision of the Department of Public Works, and, what sounds less reasonable, that the cost at which the steam should be furnished should be determined by the commissioners of the sinking fund. The committee on public works, however, to which both resolutions were referred, has reported in favor of the original resolution, and there the matter rests at our time of writing. It does not conciliate the confidence of people without the city to be told that the question was decided in committee by a strict party vote. Another company has offered to pay the city twenty per cent of its profits for the privilege of laying its pipes under direction of the Commissioner of Public Works, to allow the city to appoint a director, and to supply it with steam at forty per cent less than its present cost. In view of this competition an astute alderman proposes to sell the right to lay the pipes at public auction, with a lowest limit of half a million dollars for the franchise.

WE know nothing of the good intent or responsibility of the projectors, but the proposition to require substantial security against damage to sewers, gas-pipes, water-pipes, pavements, and the like, is certainly reasonable. There is no lack of opposition, on the ground that the streets are already sufficiently crowded with the other pipes, and as things are, this is certainly a serious objec-

tion. The cost of the constant tearing up of pavements in great thoroughfares, and the interruptions of traffic due to it, have become great annoyances. The network of pipes and sewers is already quite as complicated as it ought to be, so long as they are so difficult to get at; and the addition of a new system would make it a good deal worse. Nevertheless, if the Holly system is really as useful as its advocates maintain, these things ought in some way to be adjusted for it. All this only points the conclusion that it is time to give up our old fashion of burying the underground circulation of our cities in solid earth; and that sub-ways must soon be accepted as imperative under their chief thoroughfares. The cost of repeated excavating and re-excavating, filling and refilling, pulling up and relaying pavements, must have already outrun, in a single generation, the cost of adequate tunnelling; but the gross expense, being divided among different corporations and different times, has never been taken into account, to say nothing of the interruption to business, which cannot be computed. Such sub-ways must necessarily be built by cities at their own expense, but the companies whose pipes were carried in them might reasonably be taxed for their use, and new companies which were saved the necessity of excavation could afford a liberal impost. In case steam pipes were carried through them, they could be availed of, with a trifling expenditure of heat, by boxing or otherwise, to secure the water pipes against danger of freezing, which in northern cities would be in itself an important service.

The opposition to the New York elevated railways grows. The property owners on Sixth Avenue are combining to pour complaints against the Metropolitan road upon the grand jury. Those of Fifty-third Street, between Sixth Avenue and Ninth Avenue, through which it is now proposed to carry that road, have united to oppose it, and have shown their earnestness by submitting to an assessment of two and a half per cent on the valuation of their properties to carry on suits. An application for an injunction has been entered in the name of one of them, as a test case. It is claimed in their behalf that property on that street has depreciated one half since it was decided to carry the road through it. One owner declared that houses which had before rented for sixteen hundred dollars now went begging at half that rent; another, that within a week he had lost a thousand dollars on the rent of one house because of the road. This is the first serious attempt to stop the progress of the road, and will be pressed vigorously. If the injunction fails, there will remain suits for damages, of which there are probably enough in waiting to bankrupt the company if they succeed. It is quite clear that the roads involve a sacrifice of the streets through which they are run. The cost of this sacrifice is a part of the expense of the roads which was not counted when they were planned. At present it is borne by the owners along the route, but ultimately it must come upon the roads themselves, unless they are strong enough to stave it off and remand it to the abutters — an oppression which it is to be hoped cannot be enforced — or to the city. Thus far the popularity of the roads seems to indicate that they are a success. But their tariffs have, doubtless, been fixed without a view to the cost of compensating the injury they do, to which cost that of constructing and maintaining them may be a trifle. When this is added, whether it takes effect on the rates of fare, or in sinking the money of the original stockholders, or remains the burden of the unlucky abutters, we may discover whether or no the device is, on the whole, a profitable one. Brooklyn and other cities may learn from the experience of New York that an air-railway will monopolize the thoroughfare which it occupies or makes, and stop to consider whether it is on the whole a cheap means of "rapid transit."

The managers of the roads are trying their best to abate the noise, which is the first nuisance complained of, by finding some way of securing the rails so firmly that they will not rattle, and of cushioning them with elastic material, so as to check the transmission of vibrations. We have as yet seen no account made of what we suspect to be the greatest cause of the noise, — the use of sonorous iron for the trestle-work of the tracks. This was the most natural material to choose, because it was the lightest, cheapest, and least obstructing. But it would perhaps be found that for durability, as well as for noiselessness, the best construction would be a viaduct of brick piers and arches, properly ballasted with gravel, on which wooden sills with cushioned rails might be laid, the upper part of the brick-work perhaps being laid in asphalt, to further check vibration. Such a viaduct would be best adapted for wide thoroughfares, and under it the heavy traffic of the street might pass quietly on stone tramways, without mixing with the lighter vehicles outside. It would be somewhat expensive, and would add seriously to the obstruction of narrow streets; but we may remember that narrow streets are unfit for elevated roads, and are pretty well destroyed by them, at all events: there would be a choice to make in any given case between the better structure and the lesser obstruction. When the question of noise is met, the question of smoke and dust will still remain. The dust and cinders are a great annoyance, if nothing more. Any one who remembers the permanent condition of the air in the tunnels of the London underground railway will easily believe that even under open sky the constant discharge of carbonic oxide from trains which are always passing, into near windows on the lee side of the track, must be actually injurious to health.

Probably few people are aware from how far back the importance of the city of London dates, and what a considerable town it had become even before the Roman invasion of Britain. History has next to nothing to say about the town in the Roman times, although it is made clear that it was then, as ever since, a city of merchants, by the chance mentions of historians, and by the fact that the mint of the province was fixed there, as is shown by many Roman coins. It is only by what is new and then found in excavating for foundations that indications of the actual extent of the Roman town are got at. The classic remains are buried so deep that ordinary excavations do not reach them, but by recording and comparing the discoveries which have been made at intervals the compass of the old city has been tolerably well made out. It extended along the river from the site of the tower to Ludgate, including, even then, a quarter on the south side, and must have corresponded approximately with the city comprised within the old Saxon or Norman walls, of which remains were left in the sixteenth century, and marked the limits of what is still called the city. That the town was wealthy as well as busy is shown by the things that have been dug up, — pottery, bronzes, mosaic pavements, sculptures, and even fragments of wall-painting. A late number of the *Architect* gives a print of a relief just found, which is the most important piece of Roman sculpture that has yet been discovered there. It was dug out in excavating for foundations on Camomile Street, on the eastern verge of the Roman town, among a mass of fragments of old buildings, consoles, columns, cornices, etc., with some inscriptions and bits of sculpture. It is imagined that the building was a mausoleum, and the fact that the figure, which is in high relief, was engaged in the masonry, as well as the quality of the sculpture, indicate that it was carved on the spot. The workmanship is inferior, but the proportions and poise of the figure, the broad effective treatment of the drapery, show distinctly the classic tradition, while the dress and the character of the head are Roman. The figure wears a tunic, covered by a heavy mantle, or *paenula*, and carries a sword on its right hip. Authorities are not agreed as to what personage it represents. The right arm is gone; the left hand carries writing tablets, and something else which is not made out. The treatment of the eyes is somewhat peculiar, the irises being apparently cut in marked relief, and the pupils sunk. On its left are the remains of a Corinthian pilaster, from which and from the position of the figure it is inferred that it may have been engaged in a niche.

Simultaneously we read of the discovery, in the pool that has been dammed off from the Tiber below the Ponte Sisto, to expose its bed, of a colossal equestrian statue of a Roman emperor. It is apparently that of one who died in odium and has evidently been thrown down with indignity, for it is not only broken in pieces, but shows indentations which must be the marks of a heavy sword, and the wrist has been severed as if with an axe. Unfortunately, not enough of it has been found to fully restore it, so that the statue of Aurelius still remains the only complete classical equestrian statue. It is said to belong to the best period of Græco-Roman art, and is nine feet high, of the finest bronze, and heavily overlaid with gold. From the style of the work it is ascribed to the first century, and it has been christened, conjecturally, the Emperor Domitian. The uncovering of the bed of the Tiber has displayed a great accumulation of pieces of sculpture and architectural fragments; and the crowds that gather to look on are evidence that the popular interest is excited by it in Rome as it has not been before.

We have received the first number of a paper published by the New York Society of Decorative Art. It is a trim quarto of eight pages, to be published every fortnight, in furtherance of the objects of the society, and to contain instruction, criticism, and gossip in matters of art for those who are interested in them. It promises the collaboration of Mr. Sturgis, Mr. Prince, Mr. Tiffany, and Gen. di Cesnola. The first number takes a pretty wide range, touching on embroidery, household decoration, dramatic criticism, personal information, and news about art, architecture, philately (if our readers know what that means), numismatics, — discussed in short articles which are distributed under the different headings of the Class-Room, the Drawing-Room, the Library, etc. To these are added editorial reflections on appropriate topics and suggestions to students of art; book notices, personal information, and news about art; and a certain amount of matter whose interest is rather literary than artistic. It does not assume to be a technical journal for professional artists; but is rather one which amateurs, and ladies especially, we dare say, will like to read for instruction and entertainment; and which will, as the editor in his salutatory hopes, "both promote the desire to engage in art-industries, and cultivate the taste by which their results are measured." It has ample scope for its attention; on how much of the wide field which it now touches it will ultimately bestow cultivation, its editor himself could probably not yet determine. The ideas and suggestions of the present number are good. Its literary quality is agreeable, a thing which, if secondary, is still important to the constituency to which it will appeal. (May we hope nevertheless, at the risk of being impertinent, that not even the pressure of a new undertaking will betray the editor into lending his encouragement to the popular confusion between "shall" and "will"?) We cordially wish success to the *Art Interchange*, and would remind those of our readers whom it interests, that the most valuable support to a new periodical is an early support.

MR. RUSKIN'S DRAWINGS. — DORÉ'S PICTURES.

LONDON, September 7, 1878.

My last letter was taken up by a review of Mr. Ruskin's notes on his Turner water-colors, but as the professor's collection of his own drawings excited quite as much attention here, I will devote part of this letter to his notes on them. These drawings — chiefly in line — serve the twofold purpose of showing to his pupils the various and persistent efforts by which he himself learned to draw, and of proving to the public what long and careful studies were required to form the foundation of his literary work. In the latter sense, this laborious preparation by a man of keen artistic feeling is a severe commentary on those littérateurs who assume that sufficient qualification for art criticism lies in a fluent pen. Yet, which of them can pretend to a style as beautiful as that which the author of "Modern Painters" showed in his very first writings, — a power, however, which was never permitted to seduce him from the tedious studies of a practical art knowledge?

The notes on his drawings are dated June, and therefore since his illness, from which he rises so much weakened, he says, that he can no longer undertake to teach or advise except through his works, but in them he hopes yet to make good use of the materials he has continued to accumulate for so many years. Ordered to avoid all over-strain and painful excitement he writes, "Unable therefore now to carry forward my political work, I yet pray my friends to understand that I do not quit it as doubting anything that I have said, or willingly ceasing from anything that I proposed."

The drawings themselves date from his earliest childish efforts, such as a colored copy of a map, — an exercise which he considers among the best for beginners, — down to his studies last year in Venice. The later pencil drawings show in their wiggling, uncertain touch a decided falling off from the sketches made just before he began "Modern Painters." These, principally architectural, are vigorous, and in the style of Prout at first, and then evidently influenced by David Roberts, whose Syrian sketches — done on gray paper, with high lights of lemon yellow — produced a sensation at the time, and have remained standard examples of architectural sketches. The most characteristic and best drawing is one of those made for his geological studies, "Gneiss, with its Weeds," which is a marvel of delicate finish in sepia.

But this preoccupation in minute detail he acknowledges injured his artistic sense, until, he says, "hard work under Veronese and Titian forced me to observe the two relations between line and color. But, to my amazement, the conclusive lessons on these matters were given me, not by Venetians, but by the three Florentines, Buttiselli, Giotto, and — name despised of artists — Angelico." That the lessons which he needed in aerial perspective and its effects, after geological detail drawing, should have come from schools so conspicuously hard in outline, whatever their virtues, will seem even more amazing to others than it did to himself, and perhaps prepare them, should they not have read his last pamphlet on the subject, for his present enthusiasm for Carpaccio. He exhibits a painstaking but mediocre copy of one of the latter's St. Ursula series, in Venice, which is perhaps discouraging for his pupils, as he says it "will serve to show the final manner of work in which I am endeavoring to lead my Oxford pupils."

Close to where the exhibition just mentioned took place is the permanent "Doré Gallery," which, if it contains nothing new, has still the best picture Doré has painted: "Christ leaving the Pretorium." This, while showing his best characteristics of composition and movement, is also rather fine in color, — an accident he has not chanced upon in any other of his large canvases, which are so disagreeable and dirty in tone that it is commonly reported he paints them by gaslight. This, in fact, would be no excuse, for the brilliant water-colors of the Roman school, as many of Fortuny's were, are painted in the evening schools. Account for it as we may, Doré, while having a great variety of fine and not inharmonious tints at his command, ends by enveloping them in a sickly atmosphere which spoils the general tone. As he burst full fledged, or at least full sized, to judge from the large canvases he first appeared with, into the painting world, so he seems to remain: for there is little or no improvement in his technique, in spite of lavish criticism from friends and enemies. Perhaps, however, we should not expect him to learn from experience, as he seems to accomplish things without it. Yet, genius though he may be, his works cannot be satisfactory while he scorns the laborious processes by which alone work of high art can be produced, nor can he give his genius fair play while he competes with half a dozen arts at once. He does not submit to professional training, and therefore he is but an amateur in them all, and his indefatigable labor will win for him no higher place.

That labor is certainly prodigious. Glance at the works in which his hand is shown this year. At the Champs de Mars he exhibits two large figure subjects and two fine mountain scenes, — in the latter he is at his best, — and in sculpture his large group of "Fate and Love," in bronze, which was at the Salon a year or two ago in plaster. For the present year's work he has in the Salon two immense canvases, "Moses before Pharaoh" and an "Ecce Homo," either of which would alone have occupied any other French painter the whole year, — if not five. Yet he also exhibits a group in sculpture, "La Gloire," as well as in a third department two large water-colors. In the winter, he modelled a life-sized female figure supporting gas-jets, and at the Champs de Mars he has a colossal vase covered with climbing Cupids. And all this does not represent the whole of his year's work, for he is constantly dashing off illustrations besides. It is no wonder, then, that artists are irritated with this high-handed and swift-fingered audacity; the more so, that from his power of composition his works are too full of suggestion to be entirely condemned. The painters *en masse* deny that he can paint; the sculptors repudiate him as a brother; and the architects best explain, perhaps, the fault which runs through all he does, when they say of the architecture in his designs that it is merely suggestive, and to the professional eye shows technical and historical ignorance of what he would represent. His buildings are card-board backgrounds.

In the present Exhibition in Bond Street, a collection of his original designs of illustrations, done with sepia and white, is of great beauty and interest. There he is preeminent. After the "Christ leaving the Pretorium," painted between 1867 and 1872, his best pictures are the smaller ones of "Dream of Pilate's Wife," dated 1874; "Les Tindres," the night of the Crucifixion; and a sunrise on an army of Crusaders, done two years ago, — each less good than the preceding. His two pictures at the Salon were so bad, it is a question whether they would have been admitted had he not been *hors de concours*. In fact, most of the poor pictures were marked H. C., so true is it that one swallow does not mean warm weather, much less an eternal spring.

Referring to the Salon reminds me that the Exhibition crowded out of my letters any reference to it. Though it closed August 10th, a "paternal government" makes itself responsible for the works during a month following, so my notes on it may yet serve me for a *post-mortem* examination. Not only were there but few really bad pictures, but the reign of horrors seems over, and the revolting subjects common a few years ago have disappeared. There was, too, something very satisfactory in the award of a first-class medal to Etienne Gautier, for his single figure of Saint Cecilia. In view of the many pretentious pictures crowded with life-size figures always in the Salon, — it is a mystery what becomes of them all, — this is encouraging for painters of more modest and refined works. The saint is represented lying on her side beneath a stone niche, draped in a pale, yellowish-green robe; the exquisite features (so rare in modern French painting) are turned in profile. The whole is treated with a sculpturesque simplicity suggesting a bas-relief, and is pervaded by the purest and most graceful sentiment. Very different is another first medal, Ferrier's "Martyrdom of Saint Agnes," a powerful example of current French art, though painted as an *envoi* from Rome. It is noticeable that the works of the students at the Villa Medicis are more distinctively French than are those painted by men who have never seen the Italian galleries. The saints seem to protect their own, for the other first medal was given to Ronot for his "Charity of St. Elizabeth of Hungary," an earnest realistic painting. Of the Americans, Bridgman has nothing so good as his "Funeral of a Mummy," of last year. Bacon gives with truth and

sentiment a scene on a parting steamer. Edgar M. Ward has a good Boston interior, and John S. Sargent has an extremely clever beach scene. A work painters were curious to see was Vibert's "Apotheosis of Thiers." His pictures are generally small, but full of distinction, and this one had that same fine quality; and if one adds that it was full of dignity it is praise enough. Patriotism aside, it is not a grateful subject, that of representing M. Thiers on his bier; at his head is just alighting a winged figure of Fame, and in the distance, and amid the clouds, are dimly shadowed scenes in his life,—a mode of illustration we associate with title-page wood-cuts.

The Prix du Salon fell this year to sculpture, and as it is to encourage a young artist, M. Lemaire's "Betrayal of Samson" did not need, perhaps, to be more than promising; but that no painter should have been found worthy of the regular medal of honor, and that it should have been taken from them to be given—in addition to the usual one—either to M. Barrias, for his group "The First Funeral," or to M. Delaplanch, for either his "Virgin of the Lily" or his "Music," a female playing on the violin, is not easily accounted for.

In architecture, the exhibition was curiously scanty and poor. The first medal went to L. C. Sauvageot, for a rather commonplace church built at Rouen; but the most interesting drawings were those of MM. Duclos and Suisse, prepared, I hope, for publication, as they give, among other details about Dijon, an interesting restoration of the Abbey Church of Ste. Bénigne, now the Cathedral of Dijon, showing an original tower and a huge conical baptistery, with two tiers of interior galleries, of which unusual features no vestige now remains, I think. R.

PLANTING TREES.

The manner in which trees are planted and grouped around a house has much to do with the impression it makes on the mind, and we can hardly put too high a value on any natural growth that may be made available when selecting a site for a dwelling. While we cannot point to any style of house that would not be benefited by an accessory of this kind, there are those that realize our expectations only when embowered in living green. The beauty of a Gothic cottage, for example, is heightened when seen nestling down in a grove of round-top trees, for they give greater effect to the expressive lines of the roof; and the gables, now seen through the vistas, now lost to view, are the more attractive in that they are partially concealed. Then there are often hard angles that need softening, a sharp joining of parts that had better be screened, or an undue length of some extension to be broken up, and this can be done by judicious planting. Here we introduce some of the broad-leaved ornamental trees and shrubs, there some of the feathery variety; at one point we plant a hemlock, spruce, or one of the cypress tribe; at another the graceful birch and acacia, the tremulous birch and fern-leaf beech; while, towering high above all in their majesty, the oak, the Spanish chestnut, and the maples spread their broad arms to shelter us from the sun and the storm.

Effective groups may be made of hollies, magnolias, yews, and ivies, interspersed with laburnums, purple beeches, and the more common deciduous trees and evergreens. In this way the different qualities of green may be interwoven, and what an infinite variety of effects may be produced by contrast of leaf, size, and color; for even in spring, when the foliage is in all its freshness, when no clouds of dust have settled down upon it, and no armies of ravaging worms have despoiled the groves, the green of one tree is as unlike that of another tree as the boughs and twigs of one are unlike those of another.

A building standing naked and alone is like a man left on some barren spot, without friends or companions. It excites our sympathy, and we long to do something for it,—to relieve the ugliness of its position, to cover, as it were, its nakedness, to shelter it from the blast, and to develop and bring out whatever of beauty and comeliness there may be in its outline. We would plant the ivy and the wistaria where they would climb lovingly around column and balustrade, and so dispose the acacias that their snowy petals would fall in showers around the porch. No clipped yews should find a place there, no beeches tortured into the form of peacocks or caryatides should stare us in the face, but every tree and shrub, in all its fulness and freshness, should make part and parcel of a harmonious whole. With every breeze that swayed their graceful limbs they would tell in their own glad way of the love of art and nature that reigned there. The laburnum, no longer stunted by the cold wind of its native Alps, would mingle its long racemes with the catkins of the birch; the larch would lose the ragged look of its highland home, while the mountain ash displayed its clustered wealth, ripening on every bough.

But we must use judgment in planting. The surroundings of a tree have a great deal to do with its shape when it comes to maturity. A pine, for example, out on the lawn, with ample room on all sides to expand, will grow rapidly, preserving from the start a well-rounded and pyramidal form; but if a number of these trees are planted compactly, they will shoot up into long poles, very good for many purposes and quite the thing for masts and spars, but if they are thinned out after they have been allowed to grow in this way they will present a very unsightly appearance. All evergreens are impatient of close quarters, and if forced to remain in such a position the lower limbs will dry up and fall off. A deciduous tree, injured in this way, will throw out new limbs when an opening is made for it, and in time it will recover somewhat from over-crowding, but an evergreen will never make good its losses.

Climbers add much to the beauty of a cottage. There are some climbers that might almost be denominated trees. In climbing they take a spiral winding round an object from its base up. One winds to the right, another to the left. Is this left to chance or is there some influence that governs the discretion of the spiral? Attention has been called to this before, and some day we may get at a solution. Whatever it may be, it is known that if we twist wire after the passage of a voltaic current through it, giving it the form of a right-hand screw, the point at which the current enters becomes a south pole; but if we reverse the operation, then the point of entrance becomes a north pole. Who can say there is not some magnetic influence that governs the action of plants, when opportunity is afforded them to "twist a twist"?

CHAMPLIN.

THE ILLUSTRATIONS.

PROPOSED METHODIST EPISCOPAL CHURCH AT SEA CLIFF, L. I. MESSRS. H. EDWARDS FICKEN AND CHARLES H. SMITH, ARCHITECTS.

THE CHÂTEAU D'AMBOISE.

This clever drawing of a part of the court façade is from a sketch by M. Albert de Korsak, published in the *Croquis* of the Intime Club.

THE YORK CITY MARKET, YORK, PENN. MR. J. A. DEMPWOLF, ARCHITECT.

This market, now building, is of common red brick laid in black mortar, with bands and sill courses of light drab-colored Amherst stone. The roofs are covered with Peach Bottom slate, variegated with red and green bands. A market-master's office and a directors' room have been arranged in the first and second stories of the tower. The two side gables are constructed with a view to be extended at some future period. The interior of the brick wall will be painted, and the wood, which is framed of Georgia pine, is to be oiled, with chamfers in Indian red. Cost, including fixtures, $22,000.

HOUSE AT SCHENECTADY, N. Y. MESSRS. POTTER AND ROBERTSON, ARCHITECTS, NEW YORK.

These two elevations and first-story plan show the alterations now making in an old and somewhat dilapidated house at the corner of Church and Union streets, Schenectady, N. Y., the interior as well as the exterior being entirely remodelled. The conservatory on the south and the portion shown on the west, including the music-room, kitchen, etc., are entirely new. The roof also has been materially altered, the position of many of the windows changed,—to suit interior arrangements,—and the two bay-windows and entrance porch on the side are being constructed according to the design indicated on the elevations. Moulded brick have been freely used in the string courses, etc., and slightly projecting quoins of brick have been formed at the corners of the building and the window jambs.

The old house, out of repair and meagre in detail, had a certain character which might pass as "colonial," which character an effort has been made to retain in the various applied features and detail, so that the whole, if possible, might harmonize with its surroundings, which are splendid trees, quaint old houses, and a general air of respectability and refinement which characterizes this part of this good old-fashioned and beautiful town.

THE PATENT OFFICE COMPETITION.

A REVIEW OF THE REPORT AND THE RECOMMENDED PLANS.

WASHINGTON, September 14, 1878.

The sole reason for writing this review is that the full material, consisting of fifteen original sheets, is not accessible to persons at a distance from Washington, and the work and ideas incorporated in the plans can hardly be appreciated from the published illustrations.

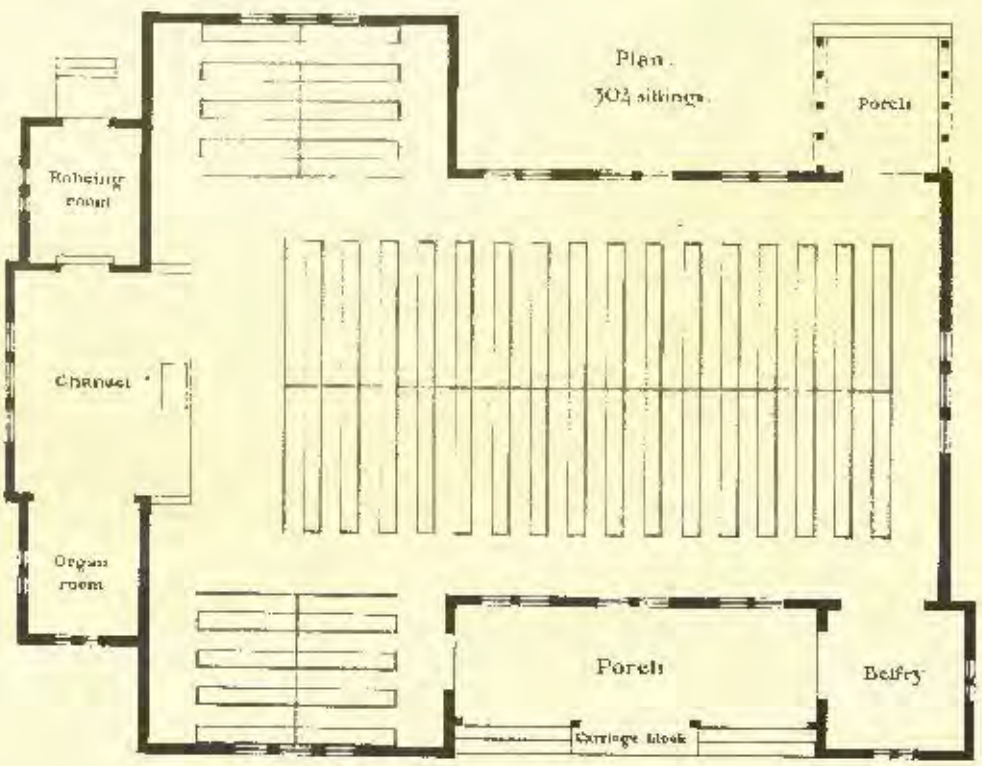
The experts began by resolving to give preference to that design which should present, in a single scheme, the most intelligent embodiment of the requirements and suggestions of the circular of June 14th, and that in justice to all competitors they must be solely governed by said requirements. In the end they decided in favor of an additional story on the Patent Office, while the circular merely suggested a sketch showing the feasibility of such an addition, which is as yet not even authorized by law, so that a full set of drawings could not have been expected from all competitors under this aspect.

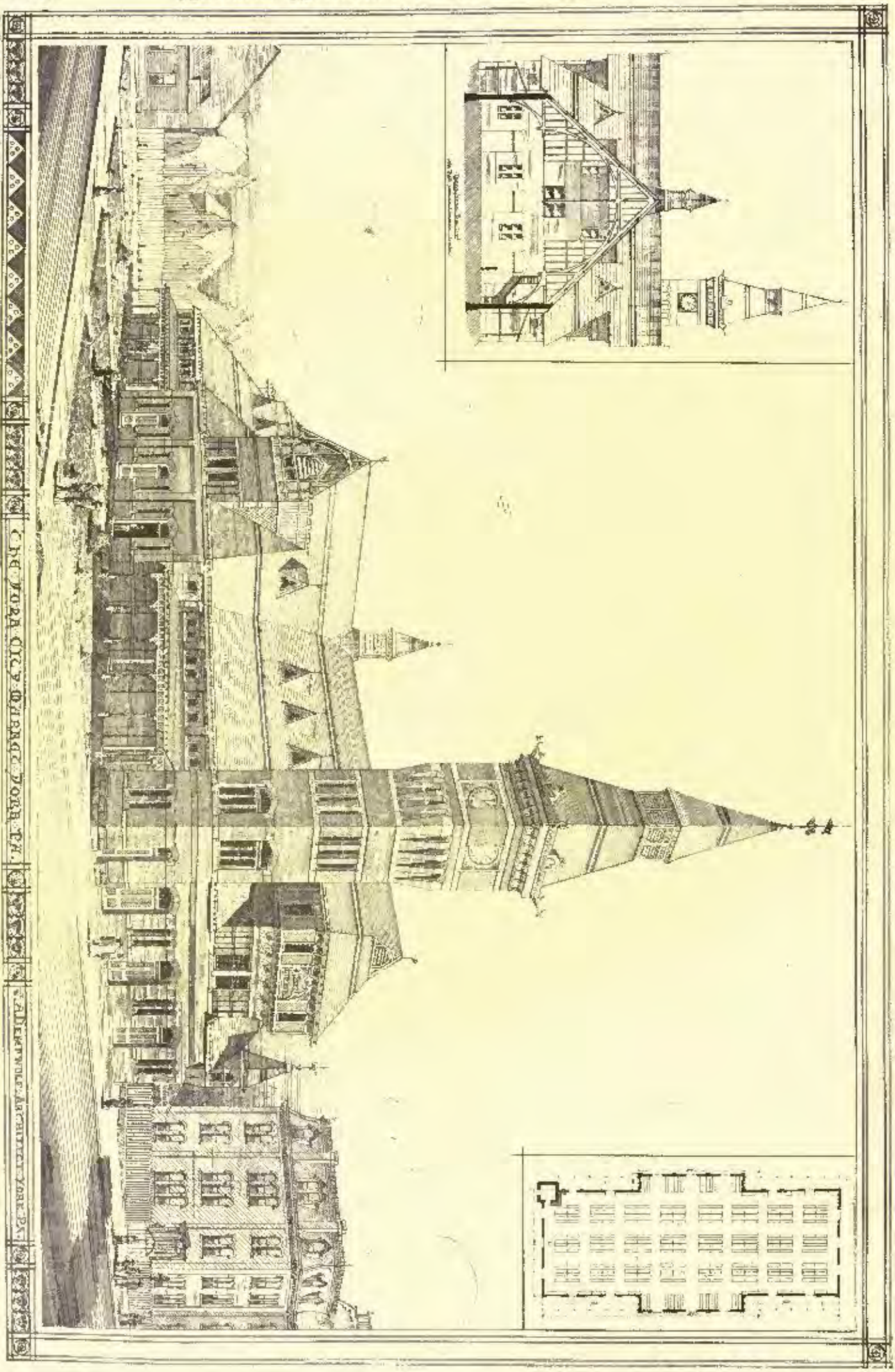
The short circular contained a mere outline of what the department specially required, presuming general acquaintance with the accommodations necessary in the Patent Office, with its 200,000 models of various sizes, and leaving free scope to the resources of the architects for exhausting the subject. Instead of the application of a technical rule, to exclude everything not specially mentioned in the circular, it would have been in the interest of the government and of the profession not to rule out anything of merit which was to the purpose, and not in conflict with the circular. As it stands, the experts virtually decided that the plans they recommend suited the wording of the circular "most intelligently," but by no means that they covered the whole ground. This would be proper in an academical tilt, where the programme is worked up by experts, but may defeat the purposes of a complicated problem of practical architecture. In the present case numerous public

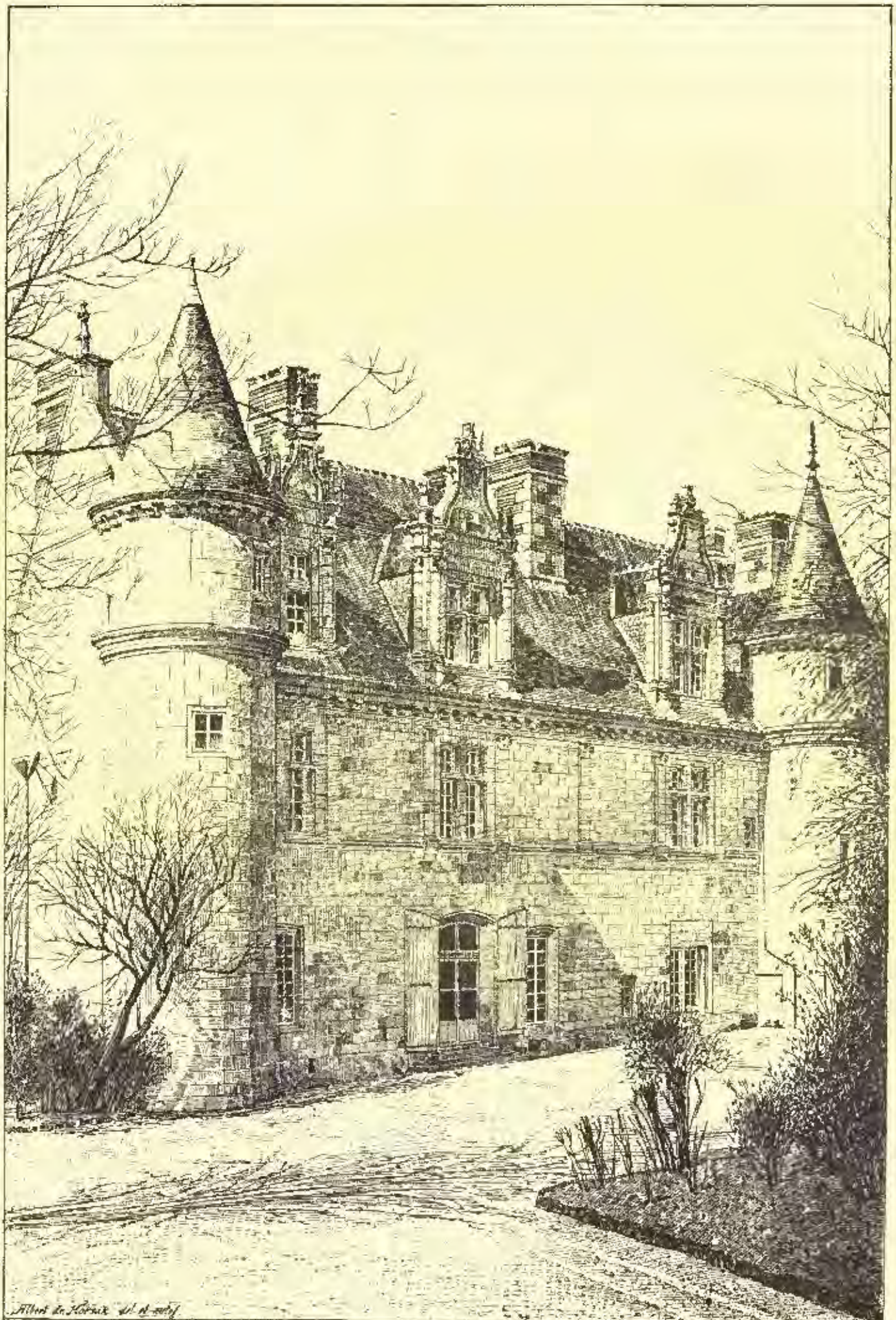
Proposed Methodist Episcopal Church,
to be erected at Sea Cliff, L. I.

H. Edwards Ficken & Charles H. Smith, Architects,
№ 57 Broadway, New York.

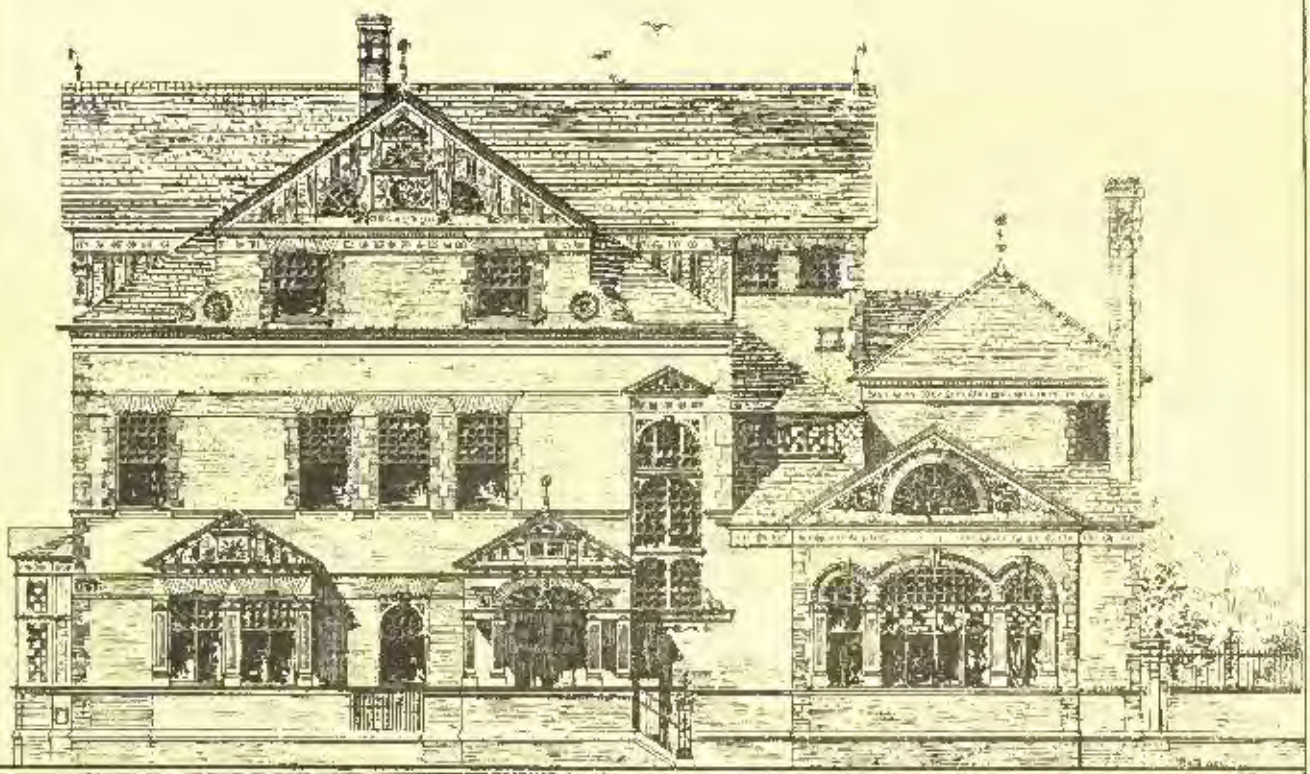
PROPOSED Methodist Episcopal Church,
Sea Cliff, L. I.



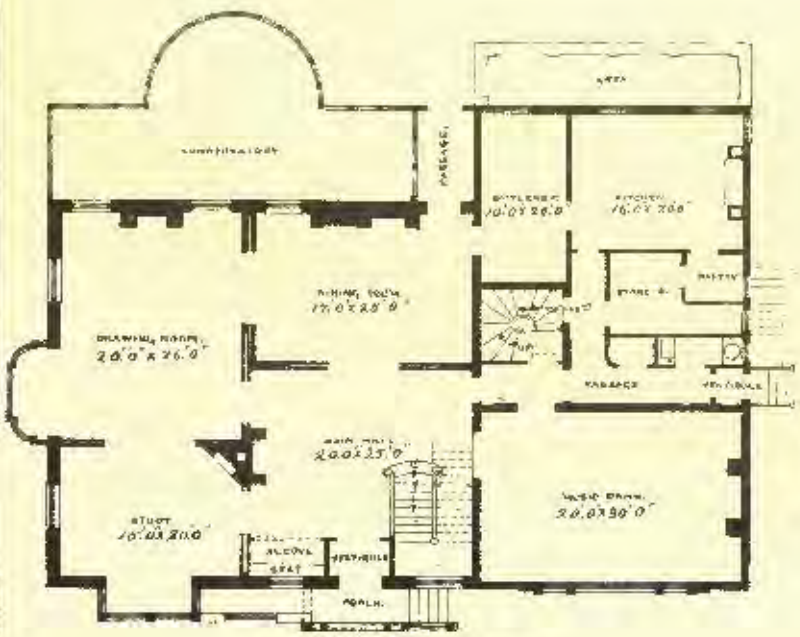




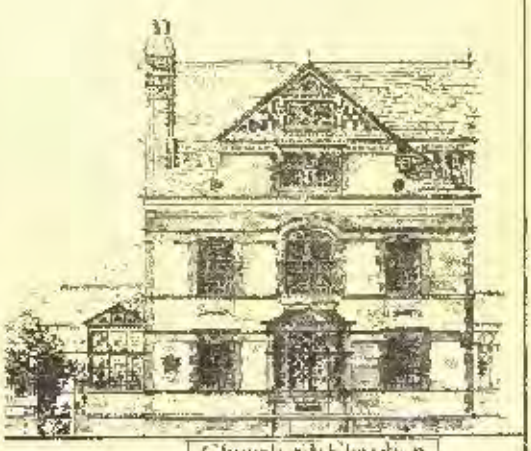
CHÂTEAU D'AMBOISE, FRANCE



House at Schenectady N.Y. Union St. Elevation. Potter and Robertson Archts. 52 W. 7th St. N.Y.



First Story Plan.



Church St. Elevation.

The Heliotype Printing Co. 220 Devonshire St. Boston.

documents, distributed over the land from official sources, bear upon the details of the problem, and are within easy reach of any citizen. The building to be reconstructed was open to all interested parties for inspection. The documents in the case leave no doubt that there is a pressing need for an adequate increase of the voluminous glass cases in the model-rooms, which, if not satisfied, would seriously impair the usefulness of the building.

"The new model-rooms, as proposed, will be of uniform height and style over the whole area of the present building, well arranged for light and air, and capable of architectural treatment in harmony with the present structure," — with this sentence the model-rooms are described in the report. The present mode of fitting up these rooms has been gradually reached by the experience of experts who have spent their lives in and with this skilled branch of the public service. It consists, substantially, of glass cases, about four feet wide, eighteen feet long, and eight feet high, the contents of which are accessible from all sides, under lock and key, within reach of the eyes of the visitor and of the hands of the officials. The proposition is to change this whole system, and to substitute wide and shallow alcoves all around the rooms, fitted up with wall-shelving about fifteen inches wide and eighteen inches apart. These inadequate, narrow shelves are piled up thirteen feet high on one floor; those above a certain height are of no use, and the exhibits are accessible and seen from but one side. We read in a marginal note of the architect, on sheet No. 12, that by this arrangement it is expected to "reach a more imposing effect." Such hasty changes can never be seriously entertained. The model-room of the east wing contains at present nearly 1,000 lineal feet of the wide glass cases on the main floor; these would, according to measurement by the plans, hereafter be reduced to about 800 lineal feet of the narrow wall-shelving. The old galleries are twenty-two feet wide, overcrowded with models, and have convenient approaches; those of the recommended plan are only ten feet wide, and reached by diminutive circular stairs.

The ceiling of the model-room it is proposed to support by two rows of piers two and a half feet square. The iron roof is independent of this ceiling, and trussed over it in the usual manner for such a span. The old roof was of the same class; its constituent parts were found, pell-mell, in a distorted shape, on the floor, after the fire. Copper and glass were molten into irregular lumps during the fire, and cast-iron began to fuse in many places; hence the temperature was about 2,000° Fahrenheit. The trusses started, by expansion, the heavy marble block-courses above the cornice, and when their resistance could not be overcome the iron-work twisted before it finally gave way. There is no difficulty now in resorting to the more rational methods developed after the heavy conflagrations of this decade. With hollow blocks containing ventilated air-spaces within their body, "uniting strength and resistance to fire and water, ... which do not conduct heat, cold, or sound," and other improved systems of construction at disposal, experienced engineers have made it an object in fire-proof constructions to avoid false ceilings, since the hollow spaces formed above them serve as ducts for transmitting the flames of a conflagration whenever joints are opened in the masonry enclosing smoke flues, in consequence of settlements or from other causes. Ventilated air-spaces, left within the comparatively thin side-walls of our dwellings, shield us against the inclemencies of the weather. The constructor's skill may easily adapt similar methods to the sloping surface of the roofs with the same results. With the new methods of construction, single skylights come in as corollaries. By better construction and by judicious ventilation, all former objections to their use have been overcome, and by the insertion of two panes of glass, with intermediate air space, in one thick sash, the cold is effectually kept out in the winter.

The experts treat the application of the new and simple methods offhand, as oversights "open to serious objection," and keep to the beaten track "on the ground of comfort." After all, they evidently felt the insufficiency of the proposed accommodations and construction, for after having counted up the merits of the model-room they "would recommend that the principal gallery be made of somewhat greater width;" and after a pause they conclude that the supporting columns of the gallery "may be made to stand over the intersections of the corridor and cross-walls, in which case the piers may become parts of the construction . . . . of the roof." This means in plain English that the galleries would better remain twenty-two feet wide instead of being reduced to ten feet, and that the roof would better have intermediate supports underneath instead of being suspended over tie-rods sixty-four feet in length. Such radical mending is strange, but still stranger it is that in the scheme of another competitor, who had placed columns for the support of galleries and roof exactly "over the intersections of corridor and cross-walls," as above recommended, this feature was objected to in the words, "but this arrangement would require modification by a widening of the central longitudinal passage."

This passage is sixteen feet wide in a room of sixty-two feet clear width; the piers defining it are located in the interest of substantial construction in an old edifice built largely of light brick walls between heavy granite piers.

In a circuit through the north wing of the Patent Office there is no staircase for a distance of about 430 feet; probably for that reason the circular called for elevators in the north and south wings. In the plans these are located in the centre of the intersections of the main corridors. The experts propose to transfer them to the well-holes of the old stairs in the east wing. These stairs having no side-light, the improvement would obstruct the light and circulation of air, which are drawn solely from these well-holes. This change of the experts, if proposed by a competitor, would have been ruled out as in conflict with the programme. Four different plans for a building in the court-yard are among the recommended designs. The experts reject them all, and propose an essentially different one in their place.

With the adoption of the amendments of the experts the distinctive features of the recommended plan in point of arrangement and construction disappear. The amendments provide for lowering the height and doubling the width of the gallery, for adding a new gallery, for changing the roof in some undefined manner, for shifting the location of the elevators, and eventually for substituting a new centre building. The new story of offices is merely a duplicate of those in the second story, which are in the *Architect* erroneously published as part of the new designs. The designs for restoration of the building as it stood before the fire are reported as inferior to those of another competitor. Under these circumstances we hardly find what actually has been premiated.

The design of a so-called "light passage" between the north and south wings has been left intact. This passage is erected upon an enormous stone-bridge construction, reaching through two stories, one of which is not at command, being underneath the foundations of the south wing and the level of the present court-yard, as shown by the official information furnished to the competitors! With these addenda to the exceptions of the experts, nothing in fact is left except the change of the external architecture.

The problem is solved by the raising of an attic story on top of the old block-course; it is about 13 feet in height, without any variation all around the building. This treatment results in giving to the building the appearance of a box, which was ever carefully avoided by architects whose designs in the Greek style are credited as classic. The porticoes were undoubtedly crowned by pediments in order to relieve the monotonous sky-lines of the building more effectually than could have been done by mere wall projections. The centres of the façades might have been rearranged in different ways: for instance, by raising them to a more prominent height, and treating them differently from the rest of the attic; or else by doing away with the present pediments, and arranging a similar feature in the attic. Tiers of attic windows in the front walls are to a varying height blocked up by the body of the pediments. Neither windows nor pilasters should be introduced in the angular space back of the pediments, which is not fitted for anything more than for a base of a higher structure. At such places skylights must be relied upon. The whole attic in all its features is clumsily conceived, a paltry addition to the "blank, mechanical repetitions of a misused order" (*American Architect*). The unfavorable proportion of the attic to the whole façade did not, of course, admit of a very lofty construction, but to make the proportions of the attic in itself clumsy because those of the massive building underneath are heavy is bad logic. The pilasters are nearly as broad as the main pilasters of the building; their proportions have not the slightest relation to those underlying Greek art; they are placed without any bases on the block-course, probably because the heavy columns and pilasters of the old building have no individually defined bases. But in all monuments worthy of imitation an order placed on top of another is treated more lightly and ornately as a whole and in detail, than the lower one. The change of the old pediments by a superadded block-course, with acroteria on the east and west elevations, with big coats of arms on the north and south elevations, and, on all, with the structures which receive the immense groups of statuary, as drawn on the original elevations on file, is anything but Greek, and it would be hard to find the link which connects them with pure classic architecture.

To make the point emphatic a marginal note of the architect by the front wall on sheet No. 9 states: "Blocks between triglyphs to be changed into windows." Hardly any architect having a due appreciation of classic art would venture to cut out the repose of the fronts by such a change, and whoever prepared the modified perspective view for your worthy journal, which was never submitted in the competition, seems to have been stopped by a sense of piety from indicating the new-fangled windows in the places of the metopes of the main cornice.

The report of the experts is silent on the merits of the architecture attempted upon the Patent Office. It touches the tender point but distantly, as follows: "The arrangement of the pilasters of the south portico is such — the outer one which must govern the projection of an attic standing considerably forward of the intermediate ones." A reference to the published ground-plan of the attic and section of the building shows that the author of the plans sets his attic on the inner pilasters of the south portico, and not (supported as they would have to be by hidden iron girders) upon the hollow space of eighty-two feet span between the two outer pilasters. This would be offensive to the eye of any one who was susceptible to the nice balance of the static forces, of action and reaction, visibly expressed in all forms of classic Greek architecture. S.

BRICK-MAKING BY STEAM. — There has been established lately in Baltimore the second factory in the country for making bricks by steam, — the other establishment being in Washington, — and it is said to be able to make 200,000 bricks per day.

CORRESPONDENCE.

WOOD PAVEMENTS.

Chicago.

Something about street pavements may interest your readers at the present time. Chicago may be called the home — I might say the original stamping-ground — of wood pavements, and she still clings to them, or they to her, just as you may choose to regard it. I remember when the wood pavement, the original Nicholson, was laid first here, or anywhere, just twenty years ago. It was in Wells Street, between Lake Street and South Water Street. First the street was levelled off with gravel. Then two-inch planks were laid across the roadway, forming the proper curve for the cross profile, for it was not difficult to spring the long planks. Then the planks were mopped with coal-tar. The blocks, eight inches high and three inches thick, were dipped in tar and nailed to the foundation. Strips, one by four inches, were nailed between them. The grooves thus left were filled with gravel, rammed in; more coal-tar was poured over the surface, and then coarse gravel was spread over all. As conducted it made a great smoke and smell for blocks around. Instead of the blocks being brought upon the ground in large box wagons, as is now done, portable steam-engines and saw-mills were brought upon the street, and there the timber was sawed.

The only wood used for the Nicholson pavement was Michigan white pine. But within the last two years other woods have been used.

On busy streets these pavements remained good for six years, and passable for eight years. They did better service than any others that have since been experimented with. The city bought the Nicholson patent, and soon many miles of streets were laid. Before its use two streets only had been paved with stone: State Street had a cobble-stone pavement, and one block on La Salle Street was paved with limestone cubes, similar to those used in the so-called Belgian pavement. These last still exist, though the street is so rough as to be almost impassable, and drivers avoid it whenever they can.

It is true that the Nicholson pavements resisted the great fire, which calcined the curb-stones so that they were literally blown away as dust. But I have noticed that where they were little worn and not covered with dust, as on the sides of the roadways of residence streets, they were burned out in deep pits. It is where they are worn by vehicles that they show no signs of decay. On the streets least cleaned they last the longest, because of the protection afforded by the street dust. It is only on the streets that are well cleaned and little used that they have decayed in this city.

Up to the time of the great fire the wood pavements gave complete satisfaction. With the exception of the two streets I have mentioned, every street of importance in the city was paved with them, and they were all in good order. Chicago paid no attention to the dissatisfaction expressed in other places.

After the fire a new system came in vogue. It was necessary to repave some of the streets without delay, and there was a great demand for the extension of pavements on many of the outlying avenues, on account of the rapid growth of the city. Property-owners would combine to make private contracts for paving, getting only the consent of the city authorities, and avoiding the delays and extra expenses attendant upon the work being done by the city government. The result was that contractors were constantly working up jobs with property-owners, by pretending to reduce the price of the paving, while they were reducing the quality in a still greater proportion. These new pavements looked as well as any others when first completed, and thus other owners were induced to combine and repave their streets, so that at least ten miles of streets were thus paved in a few years. The quality of the work was reduced to such an extent that nothing but the three-inch blocks, the grading gravel, and the surface gravel remained of the original Nicholson pavement. The foundation was entirely discarded. Contractors went about saying that it was all nonsense, that it soon decayed, and was money wasted. They said that coal-tar did not preserve the blocks; that the idea was a fallacy long since exploded. Hence pine wood was used just as cobble-stones had been, even the parting strips being discarded and gravel thrown between the blocks. But soon these pavements began to grow uneven to a frightful extent. The property-owners began to think that they had been swindled, and the city government to awake to a realization of the danger we were in. The daily papers were full of complaints, and hinted that the day of wood pavements was at an end. All sorts of new substitutes were suggested; the so-called asphalt men began to put down their sample patches over the wood in places, and even the city authorities repaired these broken pavements with cobble-stones, as if pine blocks were not fit to repair pine pavement. But when it became evident that the city had been imposed on through its failure to compel private contractors to work up to its specifications, an investigation was instituted. About a year ago a committee of the common council gave the matter serious consideration. It consulted experts and took testimony. The result was a report in which a standard for street paving was recommended for adoption. It was that all street pavements of wood should be laid on a foundation of flagging-stones, whether laid by private contract or by the city authorities. I believe that the report was not adopted, but that it was determined to make a series of tests of foundations before deciding upon a definite plan. These tests are under the direction of the Department of Public Works, and no pavement can be laid except by its permission and on good foundation. It is therefore settled that hereafter wood pavements shall be laid only on a proper foundation, and that the foundation shall be permanent, so that only the renewal of the surface blocks will be necessary in making repairs. An examination of all the streets in the city has been made to determine what are in need of paving or repaving, and a general ordinance has been adopted defining exactly what streets and parts of streets require it, and authorizing the work to be done from time to time by either private or public contract.

It is therefore pretty well settled that wood pavements in Chicago are not a failure, and that we are to continue to use them. So far I think that our city has not only been the first to use the wood pavements, but in the beginning used the best form then known. It is now the first to recognize that wood pavements are only surface dressings, and require permanent foundations, which will not need to be renewed.

I have omitted to mention that among the foundationless wood pavements a considerable number of streets have within a few years been paved with cedar blocks, cut from round logs, similar to pavements which have been in successful use in Detroit for some time. Another experiment, recently tried on Washington Street, has been to place pieces of inch boards on edge, set solid and dressed with tar and gravel, the courses taking a diagonal direction across the street.

The experiments that have been instituted under the new ordinance are on Dearborn and Monroe streets. Three blocks on Monroe Street have been paved with a foundation of three-inch oak plank well coated with tar and finished with pine blocks laid in the regular Nicholson fashion, the blocks being six inches high. The foundation planks are so thick that it has been necessary to lay them in a longitudinal direction, because they will not spring to the profile of the roadway. This seems to be objectionable, for the reason that if individual planks settle ruts may be formed, which is not possible if they are laid crossways. In the experiment on Dearborn Street between Madison and Monroe, the same foundation as that last described has been laid, and the surface is of round cedar blocks with coarse gravel rammed in the interstices. This is saturated with coal-tar and covered with a top dressing of coarse gravel. One piece on the same street, opposite the *Tribune* office, has a foundation of three-inch flag-stones, measuring two by four feet, laid in sand so as to break joints. The surface is of cedar blocks set in the usual way.

What seems to me the most practicable and serviceable foundation has neither been tried nor suggested in connection with wood pavements, and that is a foundation of four inches of concrete. Our native cements make excellent concrete for such purposes, and are reasonable in price. Our stone breaks up admirably for concrete, and can be had cheap. Here we anticipate but little trouble from the tearing up of pavements, because branches for sewer, gas, and water pipes are carried inside of the curb-lines on every street before it is paved. We do not let three gas companies lay pipes in one street, as they do in New York. All repairs to pavements must be made by the Department of Public Works.

It will naturally be asked what we consider to be the advantages of our wooden pavements. The main advantage is the avoidance of noise. This needs no comment. The next advantage is the saving of wear and tear on horses and vehicles. The visitor to Chicago will readily note the excellent condition of work horses. What he will not see unless it is pointed out to him is that through the general use of wood for pavements business wagons and omnibuses have come to be constructed in a lighter manner than those in use in cities where the pavements are of stone. This is especially the case with omnibuses. The horses last longer and wagons wear longer here than elsewhere. With the lightening of the wagons there is a corresponding lessening of the wear on the pavements. This is one reason why our good wood pavements last longer than elsewhere. Another advantage of wood pavements is that they are cheaper than any other, thanks to this being the cheapest lumber market in the world.

Another question that will be asked is why they wear better here than in other cities. One answer has been given. Another is that there are no grades here. Wooden pavements will not last more than half as long on a steep grade as on a level. The reason is that the cranks on horseshoes always pull them one way on grades. Another answer is that this is a dry climate. In the summer and fall we seldom have long-continued rains; only showers, which run off and dry before the blocks become soaked. In winter we seldom have rain. The snow does not thaw after every fall, but the streets are frozen most of the time. The spring is the only wet season we have. Last winter was an exception to the general rule. The streets were muddy, partly because of neglect to clean them, and partly because of the mild weather. The result was disastrous to the pavements without foundations, and caused considerable decay in better streets. The comparative dryness of our climate will serve to account for the difference in lasting qualities between our pavements and similar ones in our Eastern cities. It may be noted here, too, that artificial preservatives have never been used on woods in our pavements. Chicago contractors have distinguished themselves only in Washington and elsewhere by the use of such inventions.

I wish to say only one thing more. It is a mistake to let wooden pavements take care of themselves until they are used up. Every defective piece should be taken out as soon as it is discovered. Again, every wood pavement should, in dry weather, be periodically

dressed over with a coating of tar and coarse gravel, say every two years. Such a process will greatly prolong its life, serving to stop decay, and giving the blocks a hard surface. This is more important in a place where the streets are conscientiously swept.

Another improvement now contemplated is to pave the gutters with small cobble-stones laid on the same foundation as that used for the wood blocks. In such places the wear is small, and loss from decay is greater than in the centres of streets. The system is in successful use in Detroit. W.

ST. JOHN, N. B., September, 1878.

THE citizens of St. John are a church-going people. Nowhere else in America, except perhaps in Brooklyn, is the custom of attending church so universal. The demand, therefore, for new buildings to supply the place of the churches destroyed by "the fire" was urgent; and the ruins of our city were scarcely cold before "delegations" were organized and sent abroad in various directions to profit by the sympathy which our misfortunes had excited.

The Roman Catholics of our city worship in one edifice, a fine stone cathedral, which happily did not stand in the track of the conflagration. Their only loss by the fire was a very old wooden church, which had been converted, some years ago, into a lecture-hall and school-house. The replacing this with a substantial brick structure is the only building operation in which they, as a church, have engaged.

Of the four places of worship in the city proper belonging to the Church of England, two were destroyed, namely, Trinity and St. James. On the former progress was reported in your issue of August 3d. Since that time the building committee have adopted the design (referred to in your paper as No. 2) sent in by Mr. Thomas, of Montreal. Working drawings and specifications have just been completed, and tenders will be asked for at once. The latter building is situated on Main Street, and is at present just being roofed in. It is intended to accommodate about 500 persons, and will cost about $10,000. The walls are of limestone rubble, with finish of freestone. The architect is Mr. F. J. Camp, of the firm of Croff & Camp. His design was selected in an informal competition, and he describes the style of architecture adopted in "this modest, but charming, contribution to the beauties of the new St. John" as the "Commercial Gothic or Early English." The curves of the window and door heads, however, are struck from four centres, and this, together with its exceedingly low-pitched roof, gives it some claim of very distant kinship with the Tudor family.

The Methodists are building three churches in the city proper and one in Portland. That known as the "Lower Cove Mission" is situated on the corner of St. James and Carmarthen streets. It has a frontage of 50 feet, and is 72 feet in depth. It is intended to seat about 500 persons, and its cost will be in the neighborhood of $10,000. Mr. D. E. Dunham is the architect; and the material being wood, it will probably be a study in the style known as "Carpenter's Gothic." The limit set by law to the height of wooden structures in this part of the city has rendered the ordinary pitched roof impossible. A French roof, relieved with gables and truncated towers, has been used in its stead; but the work is not sufficiently advanced to enable one to form a very clear idea of its finished effect. Of the other three Methodist churches Mr. John Welsh, of New York, is the architect. All three bear a strong family likeness, the fronts being all built of rubble masonry, with window-finish, tracery, and dressings generally of artificial stone. The mouldings and tracery will be identical in each, the same moulds being used for casting them. The style of architecture claims to be the fourteenth-century English Gothic. Mr. James Thompson, of Portland, is the builder of all three. The artificial stone is being manufactured here by Mr. Wheeler, of New York. Its composition is mainly Portland cement and sand, and when finished it is of a dark bluish tint. In regard to its ability to stand the severities of our climate opinions are divided, and it meets with very little encouragement in private work. The Centenary Church, the largest of the three, is to be placed on the corner of Princess and Wentworth streets, and is to accommodate 1500 persons. The school-house, which will form in outward appearance the transepts of the church, is already roofed in. It is 40 by 90 feet, and costs about $18,000. The Germain Street congregation is building its new church on Queen Square, and the walls are at present built to the height of about 20 feet. The building is 60 feet wide and 124 feet in depth. I have not had an opportunity of examining the plans, but a description published in a local paper says that "both church and school-room are to be under one roof, and the interior will be so designed that these can be thrown into one grand audience hall." This building will cost about $60,000. The Portland church is similar to the above, but will have its school-room in the basement. It will cost about $30,000.

The Baptists are already occupying one of their new churches. It is at the corner of Germain and Queen streets, and is 65 by 100 feet on plan. It will seat about 800 persons, and has cost about $45,000. Messrs. Dumaresque & Dewar, of Halifax, are the architects. The material used is brick, with scanty stone dressings, and the spire is some 150 feet in height. School and class rooms are in the basement. The auditorium is seated with pews, or rather benches, arranged in circles, and this, with a steep horse-shoe gallery and very brilliant colorings in the ceiling, gives it quite a theatrical aspect. A residence for the pastor is situated at the rear of the church, and an effort has been made to extend to it the general lines and style of the church, but owing to the unavoidable smallness of its parts the effect is not pleasing. The only other Baptist church of importance is situated on the corner of Sidney and Carmarthen streets, and is now ready to receive the roof timbers. In plan it is somewhat in the form of the letter T. Its greatest length is 114 feet. Width across the head of the T is 95 feet. And the auditorium or nave has a width of about 60 feet, and will accommodate about 700 persons. In the rear are provided vestry, class-rooms, pastor's room, library, and kitchen, baptistery, and cooking range; in short, all the paraphernalia required in a church built to suit "the present age, and the habits, wants, and tastes of the people." The material of the walls is rubble-stone, with a facing of brick-work, and trimmings of "freestone" and galvanized iron. The cost of the building will be about $30,000. Mr. John Stevens, of Boston, is the architect, and as the "outline and general features are after models of the Byzantine period" we may expect something similar to Mr. Stevens's previous works, which may be seen in almost every city from Calais to Lynn.

The principal church of the Presbyterians, the St. Andrew's Kirk, on Germain Street, is, after the new Trinity, the most important church in St. John, both in point of architectural display and in the wealth and number of its congregation. In general plan it resembles the church last described. It is 74 feet wide, and has a total depth of 166 feet. It is intended for 900 worshippers, and will cost over $70,000. The architects are Messrs. Langley, Langley & Burke, of Toronto. The side walls are of brick, but the front, with the returns of the towers, is of red freestone ashlar, with olive-colored freestone dressings. The front gable is flanked by two square towers. From the tallest of these the spire will rise to the height of 175 feet from the ground.

The new St. David's (Presbyterian) is situated on Sidney Street. Its size on plan is 60 by 100 feet. The auditorium is to seat about 900 worshippers, and has a gallery on three sides. A hall for the Sunday-school is provided in the basement. The material employed is brick, with stone dressings. The architects were Messrs. Seammell & Smith, of Toronto. They furnished general drawings only. The details are by the intelligent contractor, and the double-action hinges on the entrance doors were sold to the building committee by Mr. John Stevens, architect, and were put on under his superintendence. The cost of the building will be about $35,000.

The interior arrangement of all the churches, except of those of the Church of England, which will, of course, have deep chancels, will be nearly identical. Galleries are provided at first, or provision is made for their future introduction when needed. The pews are arranged in circular lines, and a broad platform is raised at one end for the preacher, the choir and organ being in a shallow recess immediately behind him. Ventilation on the Leeds principle has been introduced in one building. In the others ventilation is to be procured by cold flues, openings in ceilings, and windows and doors. Two or three stone spires may be expected; should the finances hold out. Chimes of bells are unknown here, and none are contemplated. In the designs of the exteriors of our new churches there will be found little to delight the eye of the lover of the pure and truthful in architecture. The fortunate architects were generally chosen by means of informal competitions, and some, no doubt, owe their employment to the "reasonableness" of the terms on which they offered their services. VERAX.

AMERICAN INGENUITY.

IT may almost certainly be predicated of any modern mechanical congress that the Americans will carry off the palm for novel and ingenious application of force to practical purposes, the substitution of mechanism for hand labor in new and curious contrivances, which, to the amateur in such matters, surprise as much by the new ways in which old problems are attacked as by the fine way in which the work is done. The mass of invention and practical result from it produced by the Americans within the century, and especially the last twenty or thirty years, is so great and so important in results that it presents an important problem in political economy, — one especially interesting to Englishmen, as American mechanism is an offshoot from English, but an offshoot so peculiar in its character that mere heredity will not quite explain it. A traveller in the New World once said that the most interesting thing in America was its Americanism, and so we may say that the most curious feature of American mechanics is its distinctively American feature. As mechanical science progresses, the greater and more important inventions become elaborated by, and the property of, the nation which pushes that science furthest in its experimental studies. The result is foreseen, studied, and developed with method and certainty, and great industrial revolutions are effected with a certain and almost calculable progress. In this process England has long led and still leads the world, owing to favorable conditions of capital and labor. Fulton built the first successful steamer on American waters; but all the latest and most important advances in steamship building are English, and the great mass of the steamers afloat are English. The first monitor was American; but the puny craft of that construction across the Atlantic would all go down before one of the last English build; and though Rodman and Dahlgren instituted the experiments to which we owe most of the

present knowledge of the power of artillery and gunpowder, English artillery has left the practical transatlantic results out of the chance of competition.

Yet in spite of this the activity and insight of the American inventive genius develops more that is new and practical in mechanism than all Europe combined. The New Englander invents normally; his brain has a bias that way. He mechanizes as an old Greek sculptured, as the Venetian painted, or the modern Italian sang. A school has grown up whose dominant quality, curiously intense, widespread, and daring, is mechanical imagination. It is not the professed mechanic or ironmaster who invents, any more than the schoolmaster or the farmer. As Tintoretto left his dyeing to become a great painter, the American, be he bank clerk, pedagogue, backwoodsman, or plowman, turns in his busy brain some problem of his own, suggested by his experience of ill or too slowly done work, and like Archimedes in his bath, he suddenly finds it and rushes away with his "Eureka!" to some place where he can make his model or get it made — more frequently the former, for want of funds to get it made. There was a want the man had felt, an ideal to be worked out, and in his meditation suddenly the thing flashed on him, and is complete in all its essential parts from that moment. The number of inventions, useful and useless, thrown off in this way in the course of a year, of which only a small proportion attain the realization of the Patent Office, can only be imagined by those who have lived among New Englanders at home. — *London Times.*

NOTES AND CLIPPINGS.

Heating the New York Capitol. — The contract for heating the capitol building at Albany, N. Y., has been given to F. Tudor & Co., ventilating engineers, of Boston, who have devised a very novel and very economical method. The space now being provided for is within one half the main building, 300 by 400, two feet high, and is to be completed at an outlay of about $30,000. The leading feature is that the control of the atmosphere within the building is centered with the engineer in the basement, and he will be supplied with indicators that will show the temperature of every room in the edifice as well as that of the several parts of the two large assembly chambers. The system is an air-blast. By means of two 8-feet 8-ton exhaust fans the cold air is drawn in over the boilers, passes through two steam coils having a surface of 10,000 square feet each, and in a direct line of 250 feet from the entrance of the cold air to the end of the coils it shoots under a damper 12½ by 5 feet into a chamber, where from over the damper cold air rushes in and is mixed with the hot. Then it is caught into the blowers and sent through large zinc tubes to its several points for warming. By a movement of the damper the temperature of the air going through the blowers can be raised or lowered. Thus will be secured an even temperature; the highest proposed to be reached is 75°. There are to be six 50 horse-power steel boilers, with sixty 3-inch tubes each. They are built by Hodge, of East Boston. The fans will be worked by a 35 horse-power Buckeye condensing engine, having a 14-inch cylinder, 28-inch stroke, and running on 15 pounds of pressure. As an offset to the cooling surfaces of the many 4 by 12 windows, pipes are run behind the mopboard and will throw up from regular vents radiations from live steam.

Preserving Timber. — The improvements in saturating wood and timber invented by H. Sainsbury, of Paris, consist in employing a solution formed in the relative approximate proportions of water, one thousand litres; alum, sixteen kilos; sulphate of copper, sixteen kilos; bromide of sodium, one kilo; and iodide of sodium, one kilo. For the purpose of the invention he prefers placing the timber or wood to be treated in a close vessel, from which he draws off all the air, and into which he immediately injects the above-mentioned liquid with a pressure varying from fifteen pounds to one hundred and fifty pounds to the inch. It is stated that wood thus injected not only acquires thereby a considerable degree of hardness, whereby it is better fitted to resist wear and tear, friction, exposure to the atmosphere and deteriorating causes, but it is also rendered completely incombustible. — *Builder.*

Houses in London and Paris. — The total number of houses in London and Paris has been officially furnished to the statistical department. In Paris the total is 68,000; in London it is 460,000. There are more houses in the great English metropolis than in Paris, New York, Berlin, and Vienna.

Knox Memorial. — The corner stone of the Knox Memorial Institute was recently laid at Haddington, Scotland, the birthplace of the reformer. It will cost about $45,000. The Earl of Haddington, who presided, is a descendant of John Knox.

Iron Window Sashes. — Those interested in the practical details of architecture, particularly such as affect the comfort and convenience of every-day life, — and this should include nearly everybody, — will find the novel cast-iron window sashes which are being introduced into the new Trinity College buildings well worthy their notice and examination. In general plan much like the French casements, with which some of the readers of this may be familiar, they are much superior to them, being constructed after English models and the first ever made in this country. Solid and strong, but light and easily moved, they are hinged to the window frames, and when opened may readily be adjusted, by means of springs, to any desired angles on quadrantal arms. They are very durable, are so nicely fitted as to effectually exclude air, dust, and water, and present no "coigne of vantage" to the housebreaker. — *Trade Journal.*

Spinoza's House. — The house in which Spinoza lodged at the Hague from 1652 to his death in 1676 has just been purchased by three of his admirers, — Auerbach, the novelist, Professor Zimmermann, and Mr. Campbell of the Hague Royal Library, — who will take steps to preserve and mark it with an appropriate tablet.

The East River Bridge Cables. — Each of the main cables of the East River Bridge is composed of nineteen strands of wire. There being four cables, seventy-six strands are required. The two lower or down-stream cables were virtually completed last week. Yesterday the workmen on the bridge were engaged in running out the wire for the last two strands of the up-stream cables. It will require about two weeks longer to finish running the wire for these strands, by which time the cable work will practically be brought to an end. A number of the bridge mechanics were employed yesterday in the work of bringing together the nineteen strands of the two completed cables, so as to form a round, compact body. A few months ago seven strands of each cable were brought together and wrapped with wire at short intervals, so as to form a core. Around this core the men are now arranging twelve more strands. Large wooden clamps in two sections, with bolts at the top and bottom, are employed to bring the strands into place. When all the clamps are in position, they will be loosened enough to allow the men to nip off and draw out the wire wrappings of the core and surrounding strands. Then the nineteen strands will be pressed into the places they will permanently occupy, and the cable will be bound with No. 10 galvanized wire. After this has been done, the sheds, tool-house, and machinery on the anchorages and towers will be removed, in order that the final course of masonry may be laid.

Pure Air. — San Francisco has a city ordinance making it a misdemeanor to sleep in a room containing less than 500 cubic feet of air to each person. No effort has ever been made to enforce it against any but Chinese, and, in fact, it was passed for their especial benefit. On Friday, August 30th, a large number of these poor people were arrested for violation of the ordinance, and were confined in the city prison. The *Alta* continues the story: "They were squeezed into three cells of the following dimensions, ascertained by careful measurement: One was 14 feet long, 9 feet 6 inches wide, and 7 feet high; the other two were each 16 feet long, 6 feet 6 inches wide, and 6 feet high. The total cubic capacity of these cells was 2,179 feet, or a trifle over 23 cubic feet of 'air' to each man. At 11 o'clock Monday morning 91 Chinese were found packed in those pens, on the charge of not occupying a space equal to 45,500 cubic feet."

Fixing the Chinese. — The inhabitants of Vancouver's Island have, it seems, determined to follow in the wake of Victoria some years ago, and Queensland recently, by imposing a tax of £8 a year on every Chinese emigrant who lands in the colony. Probably this will have the intended effect of shutting out Chinamen altogether. This question of the future of Chinese emigration and the English colonies is, as we have frequently said, one of considerable gravity. On three occasions it has now been decided by our free governed colonies that they have the right to impose what is in effect a prohibitive poll tax on these Asiatic emigrants. It is certainly difficult to justify this action upon any abstract principles. According to the view which we have enforced and are enforcing still upon China, man of any nationality have the right to trade and settle within the limits of all civilized countries. We urge that the Chinese practice of shutting themselves up from the "foreign devils" is barbarous and foolish, and so on. Yet we permit our colonists to adopt Chinese methods in order to protect themselves against that very free competition in one direction that England and the colonies, too, have been so anxious to obtain for themselves in another. In spite, nevertheless, of this apparent contradiction, he would be a bold man who in support of the free trade theory should contend that lands which have been acquired and are made valuable by the energy and enterprise of Englishmen should be turned over to the unrestricted occupation of an alien race, which does not even permanently settle in the country. Sooner or later, however, we may rely upon it, the Chinese will argue these points with us as well as with the Americans. — *Pall Mall Gazette.*

Protection at Albany. — The federal government is erecting a building in Albany for the use of the Collector of the Port and other government officers, the material being granite. The Treasury Department having advertised for proposals for the necessary granite, to be delivered cut and ready for setting, several prominent citizens of Albany, including State Senator Harris, George Dawson, and Thomas W. Olcott, recently addressed a letter to the Treasury Department directing attention to the fact that there are many unemployed laborers in Albany, and asking that the proposals be allowed to offer both cut and uncut granite, in order that some of the cutting may be done in that city. Secretary Sherman in his reply says that experience has shown that "materials and labor can be secured at much lower rates when obtained after ample advertisement and competition," and that only by adopting this course can the expenditures be kept within the appropriation. This reply is conclusive. The building in question is paid for, not by the city of Albany but by the whole United States, and in the expenditures only the interests of the whole country should be considered. Besides, if the workmen of Albany are favored at the expense of economy, the workmen of some other place will be deprived of employment. — *N. Y. Evening Post.*

The Elevated Road. — A new plan for diminishing the noise made by the cars of the New York Elevated Railroad is suggested. Hard oak timbers are to be placed between the girders to the sleepers, in order to prevent the latter from vibrating. On the top of the oak timbers are placed three layers, one of rubber, one of zinc, and the last one of leather. The ordinary rails of the road, which are from thirty to thirty-one feet in length, are then taken up and new rails substituted. On top of the latter is placed a flat piece of iron, about three inches wide and a half-inch thick, and it is expected by these means to reduce the noise about one half.

Trinity College. — The new college building that contains the recitation rooms, the chapel, library, cabinet, and dining-rooms (the south building), has been named Seabury Hall, after the first bishop of the Episcopal church in Connecticut, as was the middle building that stood on the old college site. The new north building, that contains the dormitory rooms, has been named Jarvis Hall, in honor of the second Episcopal bishop of the State, as was the south building on the old site.

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CONTENTS.

SUMMARY: —
The Custody of Drawings. — The Barry Case. — The Enlisted-Labor Union at Washington. — The English Congress of Trades Unions. — The Condition of Labor in England. — The House of Lords on Noxious Vapors. — The English Obelisk 113

ARCHÆOLOGY AND AMERICAN ARCHITECTURE 114

OPEN FIRE-PLACES. I. 116

THE ILLUSTRATIONS: —
The Temple of Herod. — The Allemania Club-house, Cincinnati. — Semi-detached Houses, Boston. — Cottage at Claymont, Penn. 117

NOTES ON ARCHITECTURE IN PALESTINE 117

COMMUNICATIONS: —
L'École des Beaux-Arts 119
Black Mortar 120
The Ownership of Drawings 120

NOTES AND CLIPPINGS 120

A CORRESPONDENT has written to ask us for facts concerning the decisions of cases where the custody of an architect's drawings is involved. Unfortunately the decisions are hard to come at, the custom, which is undoubted, having been seldom brought up in courts, and the records being meagre and scattered. The most famous and important case in English practice is that of the drawings for the new Houses of Parliament; but being one which involved peculiar relations it is not a guide in ordinary practice. We have not had time to look back to the history of the case, which is distributed through a long series of the English building journals of 1867 or thereabout; but the facts, as we remember them, were these. It was a good while after Sir Charles Barry's death that the office of Public Works surprised his son, Mr. Edward Barry, now president of the Royal Institute of British Architects, — who had succeeded to the business and records of his father's office, and to his place as architect of the building, — with a demand that all the drawings should be turned over to the government as its property. Mr. Barry refused, alleging the usage by which drawings remained the property of the architect. Much testimony was introduced to show that this was the undisputed custom of the profession; but the government overruled it as a custom which ought not to apply in the case of so important a public building, and took possession of the drawings by a sort of right of eminent domain, we believe, on the ground that it was essential that the plans of such a building should be in its own possession, and become part of its archives. It has been suggested that Mr. Barry would have done better to acknowledge that the government ought to have plans of the building as a record, and to offer, while pleading the recognized custom of retaining the originals, which in their ordinary condition are seldom very serviceable for this use, to furnish suitable duplicates of the important drawings, requesting a proper allowance for the cost of this unusual service. This seems to be the reasonable suggestion for such cases, recognizing as it does the rights and needs of both parties; how far it might have prevailed against the despotism of the then Commissioner of Public Works, Mr. Ayrton, is questionable.

THE decisions in the United States which bear on the usage, are, as we have said, not easy to get at. The cases have not been many, we suspect; and probably, like most of the cases of architectural practice, have not been carried far enough to make their appearance in the official reports, having either been decided by referees, or by inferior courts whose opinions are not written out, and whose proceedings are recorded, if at all, only in the columns of enterprising newspapers, and live only in the memories of the persons directly concerned in them. Hence it follows, as we have before complained, that the actual jurisprudence of architecture has to be made and remade with every new case, and advances very slowly. It is not long since we printed an article on this subject, giving the facts and the reasons of the custom as it exists (*American Architect*, June 15, 1878). We have made more than one effort for information bearing on this and other like legal matters. Our readers would do a service to us, and also, we think, to the profession, if they would favor us with an account of any apposite cases in their experience.

IT is not to be expected that the promoters of the Enlisted Labor Association now forming in Washington will be able to prevail on the government to undertake a philanthropic venture on the scale that they propose. In some ways it would be a worthy offspring of the visionaries who testified before the Hewitt committee, but as there are points in the scheme which look practicable it may possibly gain some favor. It is proposed to obtain from Congress authorization to enlist for a term of five years a body of one hundred thousand men, who shall do both military and agricultural service and who shall be paid by government at the same rate as the soldiers of the regular army. As soon as a corps of ten thousand men has been enlisted it shall be sent off to some designated government reservation, and having selected therein a suitable site shall begin to lay out and build a city, to reclaim and till the land, and develop the mineral resources of the country. As one of the provisions of the scheme is that one whole regiment of each corps shall be composed of engineers — a provision which may suggest to the scoffer that the inventor of the scheme is an engineer who wishes to better his home practice by moving his rivals from his path — we might expect these new cities of the plains to have in plan somewhat of the attractiveness of Philadelphia. A much more reasonable provision is that each company shall include a minimum of twelve skilled artisans. Food, seeds, stock, and farming tools are to be supplied to the volunteers by the government, which is also to grant to each man an honorable discharge at the end of his term of service, together with a patent for one hundred and sixty acres, in accordance with the provisions of the Homestead Act, or if the discharged volunteer prefers he may obtain a lot in one of the new cities, wherein every other lot is reserved to the government. This and the benefits that naturally accrue from the reclamation and settlement of land, together with the possibility of temporarily getting rid of a portion of the disturbing element in society, the followers of the Cohens and the Kearneys, are seemingly the only incentives the promoters of the scheme hold out to the government as returns for the very material expenditures they demand.

AS one reads of this latest suggestion for relieving the overstocked labor market, pictures of these modern legionaries intrenched in circumvallated camps, while busied with the vast engineering undertakings which are to serve for the alimentation and protection of future walled towns, present themselves to the mind. One can fancy portions of Roman history repeating themselves, on the plains of the far West; the fratricidal quarrels arising while laying out the city walls; the Agrarian laws; the secessions; the rise of favorite corps commanders to the dictatorship and the consequent internecine wars; expeditions into Mexico and the British Possessions; and as seemingly no provision has been made for sending wives with their husbands, it is possible that that corps which is established nearest to Utah might make a descent on Salt Lake City and beguile the fair dames of Mormondom, as formerly their Roman prototypes prevailed on the Sabine wives and maidens.

DURING the second week of September the eleventh annual congress of trades-unions took place at Bristol, England, and was attended by one hundred and forty delegates, who represented six hundred thousand members belonging to twenty-one trades' councils, and ninety-five affiliated trade societies. Certain of the subjects which were proposed for discussion were pertinent to the occasion, as, for instance, the liability of employers to make compensation to the workmen, or their families, for injuries received in their service; the reform of the jury law, by lowering a juror's qualifications so that a larger number of workmen might be able to share this unpopular function; the extension of the Employers and Workmen Act to English seamen in British waters; certificates of competency for men in charge of steam-engines; coöperation and trade-unionism; representation of labor in Parliament; and overtime and apprenticeship. But when workmen or their delegates propose to discuss a reform in the patent laws; the abolishment of imprisonment for debt; the codification of the criminal law; and the reform of the magistracy, both as to the manner of the appointment of magistrates and as to the manner in which they shall exercise their functions, — one recognizes the time-honored tendency of politicians to capture all social organizations which

are large enough to be made useful, and convert them to the general uses of a political party.

The addresses made at the Congress had running through them an ill-concealed vein of hopelessness, and though the most was made of the few things favorable to the growth of trades-unions that had occurred during the year, the general impression conveyed was that the employers had, and were likely to have, the best of it by reason of the leagues which had been formed among them, and because of the now common custom of inserting in contracts a strike clause which allows contractors to postpone the completion of the work indefinitely, or at least until the strikers have exhausted their resources and are ready to come to terms. The Parliamentary Committee in its report read before the Congress said: "The present year has witnessed the close of two remarkable disputes in the building trade — the masons' of London and the joiners' of Manchester. In both cases the men were supported by powerful unions with large accumulated funds and great resources in the power of buying for extra support. We regret to say that in both cases the men failed to establish their demands. This may be accounted for in many ways. Although the building trades in Manchester and London were in a prosperous state at the commencement of the dispute, yet, under the power of the strike clauses now inserted in all contracts, the employers are enabled to postpone the completion of the works till an indefinite period." These words, and the statement of disbelief in the success of the coming struggle with which the cotton spinners of Blackburn entered upon their strike not many months ago, seem to show that before long these useless conflicts between labor and capital may be abandoned in favor of the more logical and certainly less wasteful method of settling trade disputes, the method of arbitration by referees. It would not be very difficult, we believe, to show in any case where strikers have gained their point that they would have succeeded as well by entrusting their cause to skilled pleaders before a board of arbiters.

In 1862 a select committee of the House of Lords was appointed to investigate the character and amount of the injuries that were due to the noxious vapors and gases which were among the waste products of various manufacturing processes. The investigation bore chiefly on the copper smelting and the alkali works, and as it was proved that muriatic (hydrochloric) acid gas was emitted from the alkali works in quantity sufficient to blast the crops and trees in the direction followed by the prevailing winds, even throughout a distance of six or seven miles, a law was passed which compelled manufacturers to condense ninety-five per cent of the acid produced. It has since been ascertained that it is sulphurous and not muriatic acid that chiefly injures vegetation, so an amendment, passed in 1874, brings into the category of noxious gases sulphuric, sulphurous, nitric, sulphuretted hydrogen, and chlorine gases. Upon the workings of this law a Royal Commission has reported lately and has brought to light facts that are curious and interesting. The complaint as to the destruction of vegetation turned out to be reasonable, but the gases were found to affect most injuriously the trees and plants on high ground, while the vegetation in valleys and on the farther side of slopes was often uninjured. It was also found that the higher the factory chimney was the more wide-spread was the devastation. As regards health it was proved that if not absolutely deadly, the gases at least caused headache and depression. In the neighborhood of London, where there is a great variety of large establishments, other phenomena have been observed, which being proved nuisances, to say the least, call for legislative action. Chief among these obnoxious places are the cement works at Northfleet and Greenhithe on the Thames, which produce such dense vapors while burning the chalk and clay that navigation of the river is made dangerous, and the Thames conservators have been petitioned by fifty steamship masters and one hundred and thirty London Trinity pilots to abate the nuisance. The production of these vapors may throw some light on the late terrible disaster to the Princess Alice. It is said, by the way, that the river at the spot where the steamboat sank was at the time of the disaster nothing more than a mass of sewage, as the outfall sewers were then discharging, consequently it is suspected that when the passengers found themselves in the river they were asphyxiated before they had time to swim ashore. There was probably in the discharging sewage some powerful chemical substance, for the clothing on the bodies changed color, and decomposition set in with such unusual rapidity that identification of the bodies was very difficult.

On Thursday, September 12, the second of Cleopatra's needles was placed upright in what is probably to be for ages its resting place on the Thames embankment. Whether after all a result of real value to the world or to the British people has been accomplished, or whether the enthusiasm and general interest that has been excited is purely factitious and ephemeral it is useless to inquire. The projector of the enterprise, Dr. Erasmus Wilson, has gained his object, whether it was reputation or patriotic vanity. The enterprise has been attended with many unexpected incidents which have added to the monument a subsidiary value that in the eyes of the world at large may give it greater interest than the obelisks at Rome or at Paris possess. The removal of the obelisk to Alexandria, the abandonment of it, through parsimony, by the fleet on the very eve of its removal in the early part of this century, the Khedive's adoption of it as the expression of international good will, its narrow escape from being cut up into building stone by the fellah whose land it cumbered, its redemption by a private citizen of England, its solitary and storm-tossed wanderings in its iron coffin, — an episode worthy the attention of Jules Verne, — its rescue and the subsequent suit for salvage, all these are so romantic that for the time they overshadow the claims of antiquity, claims which it shares with the other imported obelisks. Moreover, the transport and reërection of the obelisk have been watched with widespread interest because of the novel yet simple and very skilful means by which the engineer, Mr. Dixon, has accomplished them. If there is a certain anachronism in forcing upon it the companionship of modern sphinxes, it is probable that they will be less conspicuous and unpleasant than the pedestal on which rests the obelisk of Luxor in the Place de la Concorde at Paris, emblazoned as it is with incised and gilded designs which represent the means employed in the transport of the surmounting obelisk.

ARCHÆOLOGY AND AMERICAN ARCHITECTURE.

The *Architect* had lately under this title an article in which, quoting an expression that we had used, "the tyranny of archæology," it noticed the influence of archæology on English architecture and asked the questions: How far is American art free from this influence, and how far has this freedom led to good results? whether, in fine, the effort to dispense with old art does not lead, in the United States as well as in England, to disappointment. It is true, as the *Architect* says with a pleasant cordiality, that the United States "speak with an English tongue, and think with an English understanding;" and though we can hardly go so far with our fellow-journal as to say that the influence of English traditions and relics is the only influence of the kind that prevails with us, — unless "prevails" is used very literally, — it is doubtless the influence that on the whole shows most in our best work. This is not true of our sculpture and our painting, which draw more inspiration from Italy, France, and even Germany; but it is true of architecture and the decorative arts. Accessibility to the English influence of the day in these arts is nevertheless mainly confined to New York, Boston, and one or two of the most progressive Western cities, Chicago, for instance; and, curiously, it is very much a thing of recent growth. Even in Philadelphia it has but just begun to make itself felt; in cities further south one may almost look in vain for anything to remind one of the progress of English art for two generations past. It is to the influence of an earlier time that we are to turn for whatever of English tradition survives in these cities — in their custom of living in separate houses, and their consequent manner of arranging them; in their social and domestic habits. The influences that have altered their arts, so far as they have changed since the days of our fathers, are not English. From New York as far south as anything has changed the old order of things, and through the most of the West, the predominating influence has been German; in New York and Boston, and to some extent elsewhere, French tendencies have struggled with the others, while in the East there is comparatively little that shows the German mark.

The most significant fact, however, is the survival of the English influence, the power it has shown to reassert itself and overbear its rivals. Persons who have carefully watched the development of American architecture will be disposed to say that a quarter of a century ago, if one foreign element seemed

likely to prevail in it, it was the German; and, as we have seen, over some parts of the country it has prevailed. A little later, the French element, starting with our two most influential cities, bade fair to get the mastery. But the German influence has waned; the French has barely held its actual place, by no means its relative importance. The English element has steadily become more and more prominent until it has on the whole overborne both of the others, and is more or less conspicuous in the greater part of the work that is done nowadays by studious architects. This is due, no doubt, partly to the old habit of looking to English art and English literature for examples; partly to the example of a number of capable English architects who have come to live and practice among us; but more to the accessibility of English examples through the multitude of professional books that are brought to us, and keep us better acquainted with what our professional brothers are doing in England than with what goes on anywhere else; and more still to the English architectural journals, which come weekly with profuse illustrations. But these are not causes sufficient to account for all the phenomena. The Gothic revival has been stimulated by both Germans and English; M. Viollet-le-Duc has been perhaps a more honored prophet than any Englishman; the splendid architectural publications of the French press have been very widely distributed among us, and modern French detail has been imitated abundantly in our city architecture. More than this, the most of our young men who have gone abroad for architectural training have gone to Paris, finding there, what unfortunately does not exist in England, a well equipped and well disciplined architectural school. Nevertheless the English fashion gains ground, and it is not a little curious to see that even these men, trained in French ways of designing, as one by one they have come home, after working for a time according to their training have almost to a man dropped the French manner and taken up an English one. Many causes, which it would be interesting to study, conduce to this gravitating tendency, but behind all must lie a common instinct, the result of long inheritance, which inclines Americans to a natural preference for the same forms which Englishmen elect to use. Commercial as well as literary intercourse helps the influence, and while we see "Queen Anne" houses following "Victorian Gothic," they are lined with Morris papers, and decorated with English tiles and English metal-work.

In all this, however, it must be said that contemporary example has told much more than archæology. American architects as a class are not very studious, at least in a scholarly way. They lack archæological fervor, and are by native affinity more attracted to what is doing than to what has long been done. Nor have they the reverence for purity of style that waits on archæology. Although instinct or association or opportunity may lead them to draw most freely from English examples, they lay hold of their goods, like Molière, wherever they find them; and if a feature or detail from French or Italian or German architecture suits their purpose, they are seldom prevented by respect for style from working it into any design to which they can apply it. The old restraints no longer hold them. The classical period is gone; even the men who would design churches with attention to historical unity of style are passing away. The leader of them has left us within the summer, — and their successors are nothing if not eclectic. The stranger who walks through the new streets of Boston, — which we instance as a typical example because, having been in a great part built over within a few years, its architecture is at once the newest and most consistent, — will see motives of all dates, and of French, German, and Italian parentage, plentifully intermixed with the predominating English, and all transfused with something which, since it can be classed with neither of these, we must be content to call American.

But thus far we have spoken only of one kind of American architecture, the work of the more educated architects, who set the fashion on the most important buildings and to the cultivated classes, who have got their training from the traditions and literature of their profession, and who keep themselves informed of its progress abroad. Nevertheless, we must remember that there is another kind of American architecture, a kind which, though we may incline to consider it less exemplary, is much more abundant, and even more distinctly our own. It is probably what an observant foreigner would carry away in his recollection as the most characteristic part of American art, if he would call it art. It is what we have more than once described, and often referred to, as our vernacular architecture. This architecture is as innocent of archæology as the Romanesque work of the tenth century, or as any architecture can be. In fact it is the modern example of an architecture practised in the way that Mr. Fergusson and some other reformers declare to be the only way in which such an art can be living and healthy, — by men who work without regard for precedent or rule, using forms which they know only by tradition and example, and with a simple adaptation to the wants of a people, to the materials and mechanical processes at their command. It is an art which every capable building-mechanic in the country understands, and can practice without the aid of books or rules or architects or drawings, exactly as did the mediæval builders whose manner of work we are of late urged to imitate. But it is an art that is altogether abhorrent to purists and offensive to artists, one in which persons of education, offended by its coarseness and ugliness and pretentiousness, will see no redeeming promise, unless they can look through these to its vigorous independence, and have confidence that time will develop an artistic sense to chasten and shape it. It is, however, distinct and coherent; in spite of many local differences in mechanical expedients it is the same thing from Maine to California, and it is unlike anything else in the world. It is not without derived forms; no architecture has been so since that of primitive ages. Those who make it have borrowed at second or third hand many details from German and Swiss architecture, and have culled many forms with free eclecticism from the work of educated architects which they saw before them. Their chief glory, the dreadful adaptation known as the French roof, which covers nine in ten of all the works of ambitious builders throughout the land, is plunder. But they have appropriated and altered all these things as the Greeks appropriated and altered the details of their Doric and Ionic orders, and have made them as truly their own.

These then are the two components of architecture in the United States: an art of the people, chiefly in the hands of mechanics, or of architects who are only mechanics grown up; and an art of the educated profession. The two are in their characteristic examples thoroughly different, though there is of course a debatable ground on which they overlap. Out of their fusion or confusion must come the future American architecture. This is not the place to discuss what the interaction of the two elements will be, though it is clear from the present tendencies of society that the prevailing force must be the educated one, more affected perhaps by the reaction of the other than those who wield it could be made to expect. On the one hand we have a popular art, knowing nothing of by-gone ages, owing no allegiance to precedent, taking its fashions by natural selection, or by inoculation, as do shipbuilders or millliners or shoemakers. On the other is an educated profession, — not yet too well educated, on the average, but gaining every day, — more or less studious of the architecture of the past as a repository of convenient material, but not caring greatly for learning, and living much more in the present; fond of license, and quite indifferent to the control of archæology. Yet while we have seen in our freedom from this control (from the "tyranny of archæology" as we have called it) the future opportunity of our countrymen, we are often tempted to wish that for a time, and until they are a little steadier in their march, they could be subjected to it. The vigorous independence of our vernacular architects is their birthright; being their only possession it should not be taken away from them, and it cannot. But the eclecticism of the educated ones is to our mind far too lawless. It seriously impairs their sense of proportion and harmony, which is the architect's most precious artistic quality; in many cases it seems to have expelled it altogether. A study of style close enough to satisfy archæology is the best corrective that we know for this fault. For this reason we have urged the study of individual styles as the necessary means of training in architectural schools. For the same reason we have expected benefit from the tendency which we have lately seen to such archæological study as our country gives opportunity for, — from the inclination to revive what we call "colonial architecture." But we have been disappointed to see how in most cases the irrepressible American instinct has turned the repose of this into fussiness, its quiet order into lawlessness. One shudders to think what would have become of English architecture in these days, with its immense activity and its loose methods of training, if it had not had styles to restrain it. One sometimes shudders to see what has become of the American — vernacular or eclectic — exempt from this restraint.

THE OPEN FIRE-PLACE. I.

The Open Fire-place, as it is and as it has been, with suggestions for its improvement. Heating and ventilation of private houses, with original experiments on the waste heat of flues and on the use of copper, cast and sheet iron pipes in connection with open fire-places for economising the heat and improving the ventilation.

THE OPEN FIRE-PLACE AS IT IS.

That great radiator of heat to all living beings, the sun, furnishes those beings with the kind of heat best suited to support the life which it has developed, namely, that of direct radiation.

If we would only accept this lesson, repeated every day, as if for the purpose of giving it all possible emphasis, in a manner the most impressive and with apparatus the most magnificent that nature can furnish or the mind of man imagine; if we would accept the lesson, and endeavor to heat our houses after the same principles, these houses might be made as healthy as the open fields. We should be prompted to respect more the open fire-place, as furnishing the best substitute for the life and health giving rays of the sun, and to discard all such systems of heating as are opposed in principle to that employed by nature.

With direct radiation the body is warmed, while the air breathed is cool and refreshing. With the hot-air principle of heating the reverse is the case, and it is found that, when this unnatural method is long employed to the total exclusion of the natural, serious discomfort and disease are the results. That warm air is less effective than cold in purifying the blood by removing the carbonic acid from the lungs is demonstrated both by our own experience and by the investigations of science. Experiments made on birds and animals have shown that the amount of carbonic acid exhaled when breathing air heated from 30° to 41° Centigrade (86° to 106° F.) is less than one half that exhaled when the temperature is near the freezing point.

The open fire, while it radiates an agreeable heat upon our bodies, animating us with a cheering and healthy glow or excitement, like that produced by a bright sun on a frosty morning, leaves the air comparatively cool, concentrated, and invigorating for breathing.

Now, although from the earliest times of which we have record the open fire-place seems to have been the favorite device for heating and ventilating the habitations of man; although no modern house is considered complete without it either for use or for ornament; although the physician regards it as a most valuable ally in the mastery of disease; and although its improvement has at all times claimed the attention of the most distinguished scientists and philanthropists, as well as of the practical mechanic; yet we find it to-day so little understood and generally so incorrectly constructed that at least seven eighths of the heat of the fuel is lost, and its capabilities as a ventilator are almost entirely neglected, so that our fire-places may be properly described as devices contrived in the interest of the coal merchant for the purpose of carrying up to the roof, in the form of smoke, the greatest possible amount of money, and of leaving the smallest possible amount of comfort behind. My definition of the word "chimney" would be this: A long tube open at both ends, the lower opening, called a "fire-place," being used to receive fuel and to emit smoke; the upper, to direct upon the roof from eighty-five to ninety-five per cent of the heat and smoke generated below; generally so constructed as to carry off as much of the warm air of the room as is pure enough to be breathed, and cause large draughts of cold air to supply its place by rushing across the feet of the occupants in the manner best calculated to give them rheumatism, consumption, pneumonia, and other diseases. To complete the apparatus, screens are sometimes added to obstruct the circulation in the apartment.

WASTE OF HEAT.

In the city of Paris, according to M. V. Ch. Joly, there are used annually, for heating purposes, over 500,000 cubic meters of firewood alone, costing about twenty-five million francs, and of this only eight to ten per cent, or in value about two million francs, are actually turned into serviceable heat. The remainder, to the value of about twenty-three million francs, annually disappears in the air without profit to any one. "What must we estimate the total amount of annual loss," says an eminent writer on ventilation, "in fuel, both of wood and coal, throughout the entire world, when we consider that the open fire-place is used to-day by over fifty millions of people!"

DANGEROUS DRAUGHTS AND IMPERFECT VENTILATION.

The "Encyclopædia Britannica," page 897, has on ventilation the following: "An open fire-place, unless the air enters from the ceiling, often produces little or no ventilation above the level of the chimney piece, and, even then, it does not afford the best and purest atmosphere. The air above may be comparatively stagnant, and offensive in the extreme from the products of combustion and respiration, while a fresh current moves along the floor to the fire-place."

So great is the danger from cold draughts occasioned by open fire-places as they are now constructed that one is said to be less liable to take cold standing in the open air, with the thermometer at freezing point, than sitting on such a day in a room heated by a bright open fire. So unequal is the distribution of heat in such a room that water may be frozen in one corner near the window draughts, and boiled in another near the fire, and it has even been found possible to roast a goose in front of such a fire, while the air flowing by it into the chimney was freezing cold.

"I have no doubt in my own mind," said Count Rumford, "that thousands die in this country every year of consumption, occasioned solely by this cause."

In short, it would be difficult to point out any part of our usual domestic edifices which would show such a total absence of scientific principles as the construction of our fire-places and chimneys.

PRACTICAL EXPERIMENTS ON THE WASTE HEAT AND AIR CURRENTS.

The best authorities put the waste heat of our fire-places at from eighty to ninety-five per cent, depending upon the shape of the fire-place, the nature of the fuel, the amount of the draught, and the size and nature of the flue; but I have been unable to find any satisfactory records of experiments made to corroborate their statements. Those made by General Morin answer most nearly, but still not entirely, our questions. I have therefore made a number of careful experiments, the results of some of which are given in the accompanying tables.

The first six experiments were made in houses built on the new land on Marlborough Street, and the second series of five on the house No. 4 Pemberton Square, Boston. The grates, fire-places, and flues tested were of the so-called "most approved" modern construction, and calculated to utilize the greatest amount of heat possible without employing the peculiar or patented forms invented by Franklin, Galton, Winter, Ganger, Feudet, Joly, and others, little known in this country and difficult to obtain and set.

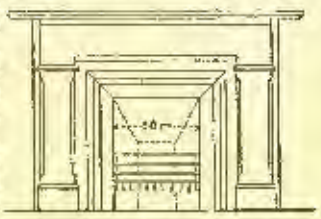

Fig. 1.

The fire-place and grate used in the second series of experiments recorded in the accompanying tables are represented in front elevation in Fig. 1, and in section in Fig. 2. The dotted lines show the form of the back only of the fire-place used in the first series of experiments, the sides forming an angle of 135 degrees with the back, to improve their reflecting power. In the second series the fire-place was smaller, shallower, and the sides were at right angles with the back, the upper half of which inclined forward as shown in Fig. 2.

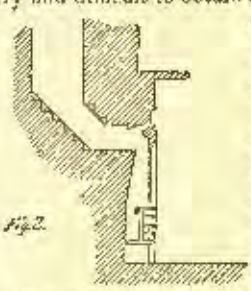

Fig. 2.

The entire length of the flue in this case was seventy feet. Half way up, or thirty-five feet from the fire-place, an opening was made in the flue large enough to receive a chemist's Centigrade thermometer, and the heat was tested at this point during the experiments in order to ascertain the amount lost by absorption in the upper half of the chimney. The thermometer was surrounded by putty to render it air-tight. When the readings were taken it was drawn out through the putty far enough to see the head of the mercury column and then pushed back into its place. These readings were recorded by an assistant in columns 6 and 16 of the tables.

For want of space only two of the tables are given, the others agreeing substantially with them, and the results being nearly the same.

The anemometer used was one of Casella's most delicate instruments, lately imported from London. A careful test previously to making the experiments proved it to be exceedingly accurate and reliable. Where possible the observations were made every minute, but where this was impracticable the intervals were made as small as possible, and the figures for the intervening moments were obtained by calculation. The amount of wood burned in each experiment was exactly three kilograms.[1]

From these tables it will be seen that the amount of heat dissipated in the open air through the mouth of the chimney from the combustion of 3 kilograms of dry pine wood, is sufficient to raise the temperature of nearly 16,000 cubic meters of air 1° Centigrade, according to the first experiment, or 16,980 cubic meters according to the second experiment; giving an average of 16,488 cubic meters raised 1°. This is equivalent to 5,070 units of heat, or enough to raise the temperature of over 5 tons of water 1° C., or to raise 50 kilograms of water from freezing to boiling point.

The greatest possible amount of heat which 3 kilograms of dry pine wood is capable of yielding being, according to Rumford, 3,590 × 3 = 10,770 units, we see that one half of the heat generated passes at once up through the chimney and out at its mouth. Of the remainder we shall hereafter see that about four-fifths is absorbed in the brickwork, and either given out from the surfaces of the outer walls or carried up in the air space between the studding and the brickwork to the roof whence it radiates into space.

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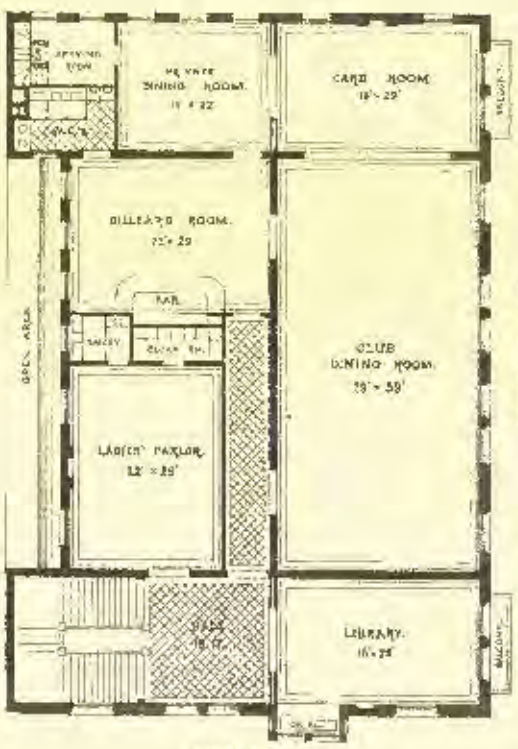
[1] In this article I shall use the metric weights and measures, both because the calculations are made easier by so doing, and because these units have been adopted by most of the writers on the subject whose works we have occasion to consult.

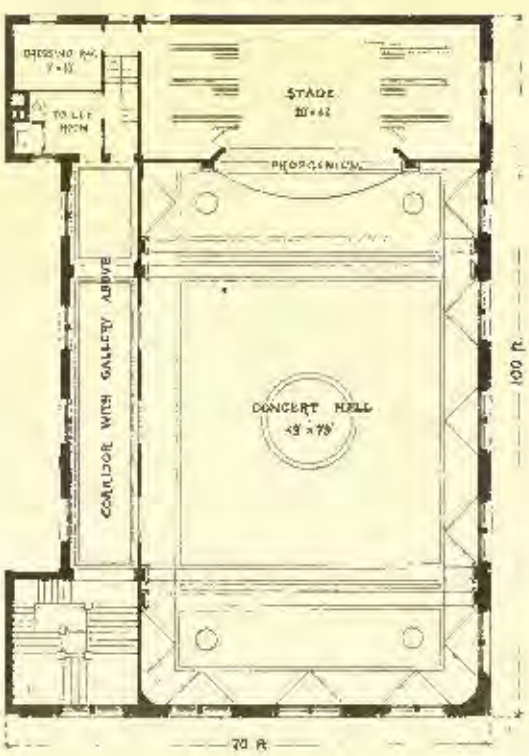
1 kilogram or kilog. = 2.2046 or 2.2 pounds avoirdupois.
1 meter = 3.28 feet; 1 square meter = 10.8 square feet; 1 cubic meter = 35 cubic feet.
1° Centigrade = 1.8° Fahrenheit.
1° Fahrenheit = 0.55° Centigrade.
1 metric heat unit or calorie is the amount of heat required to raise 1 kilogram of water 1° Centigrade.
1 calorie = 3.968 English heat-units.

THE ALEMANIA CLUB HOUSE, CINCINNATI OHIO.

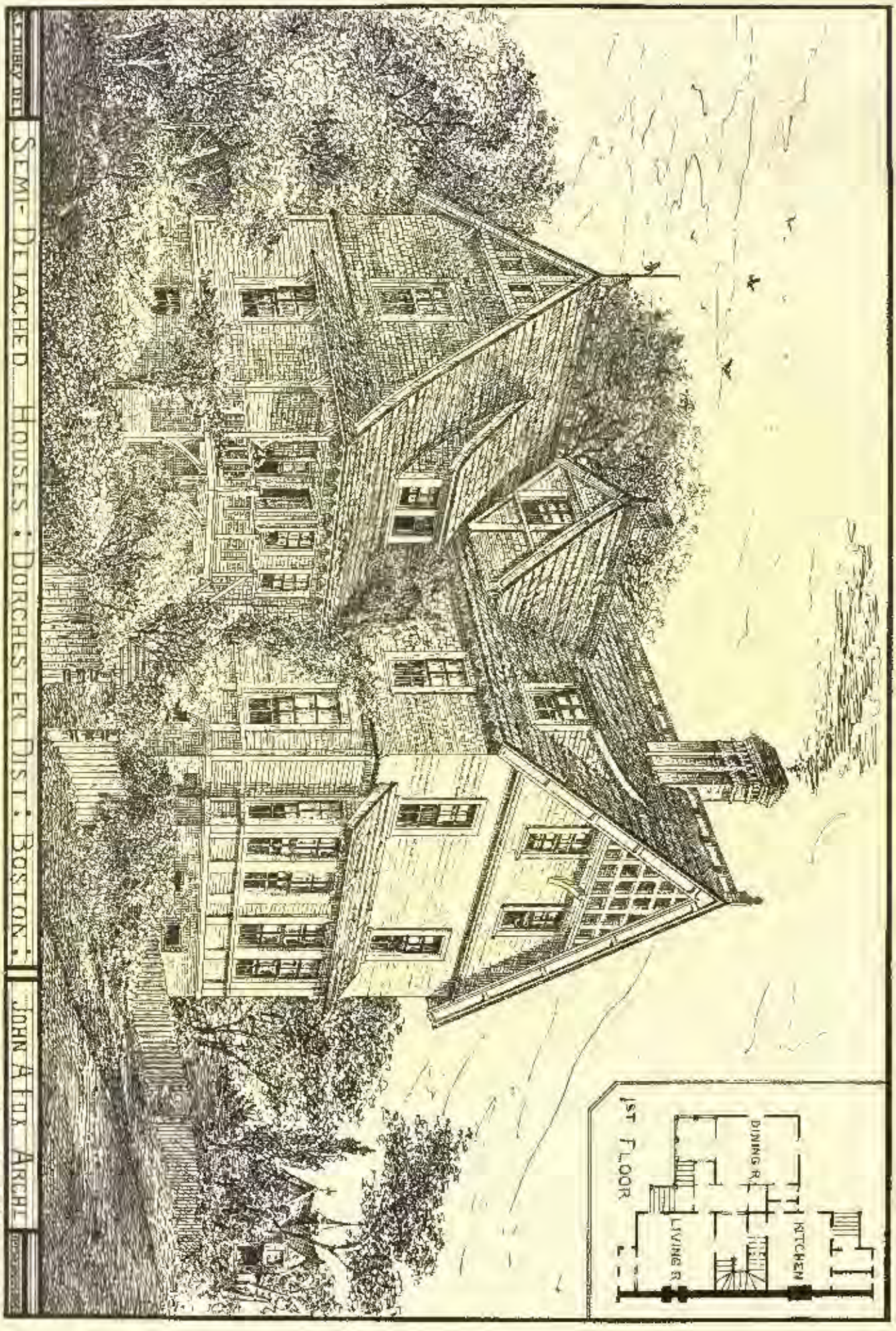
PLAN OF 2d FLOOR.

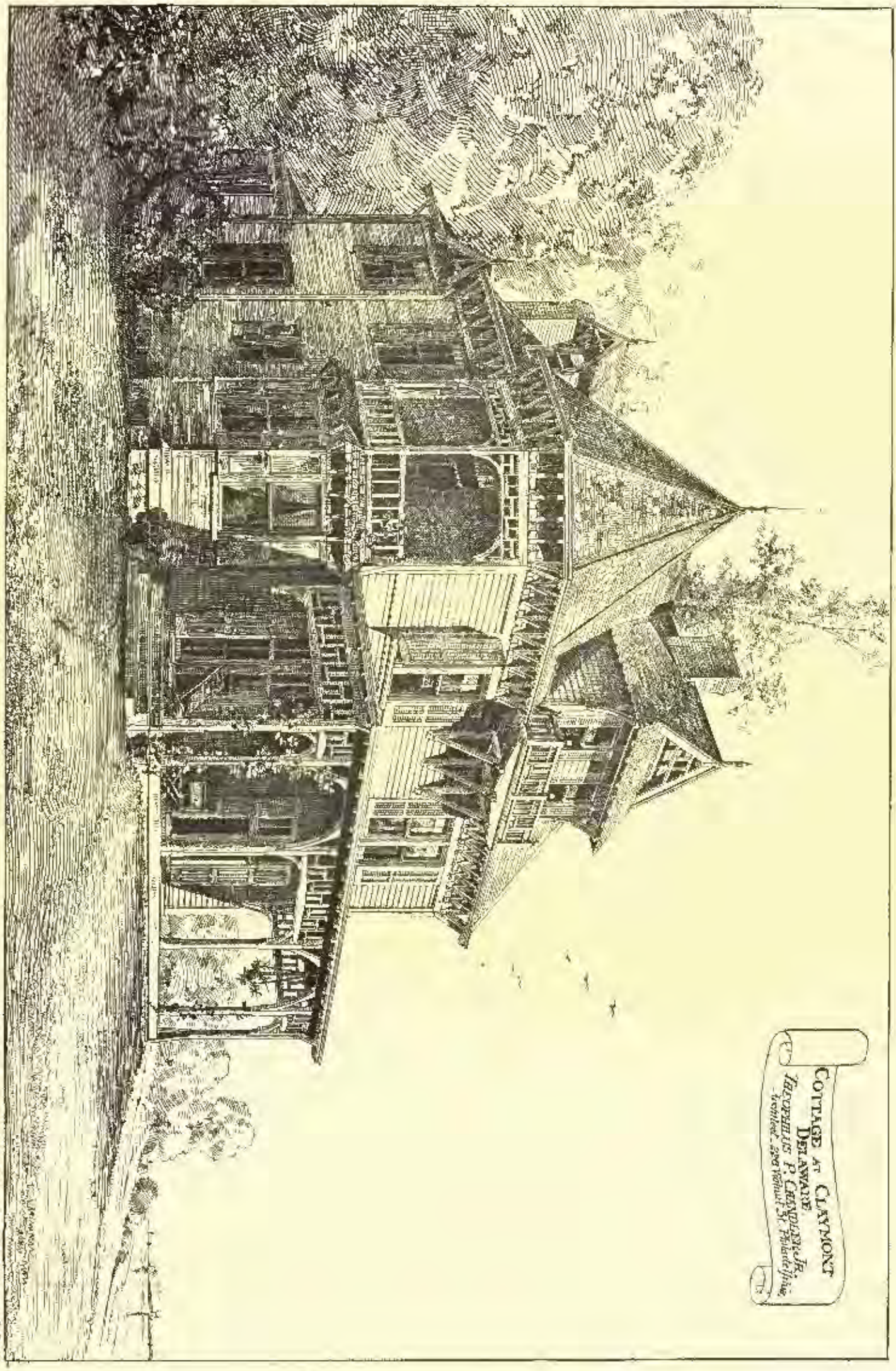


PLAN OF 3d FLOOR.

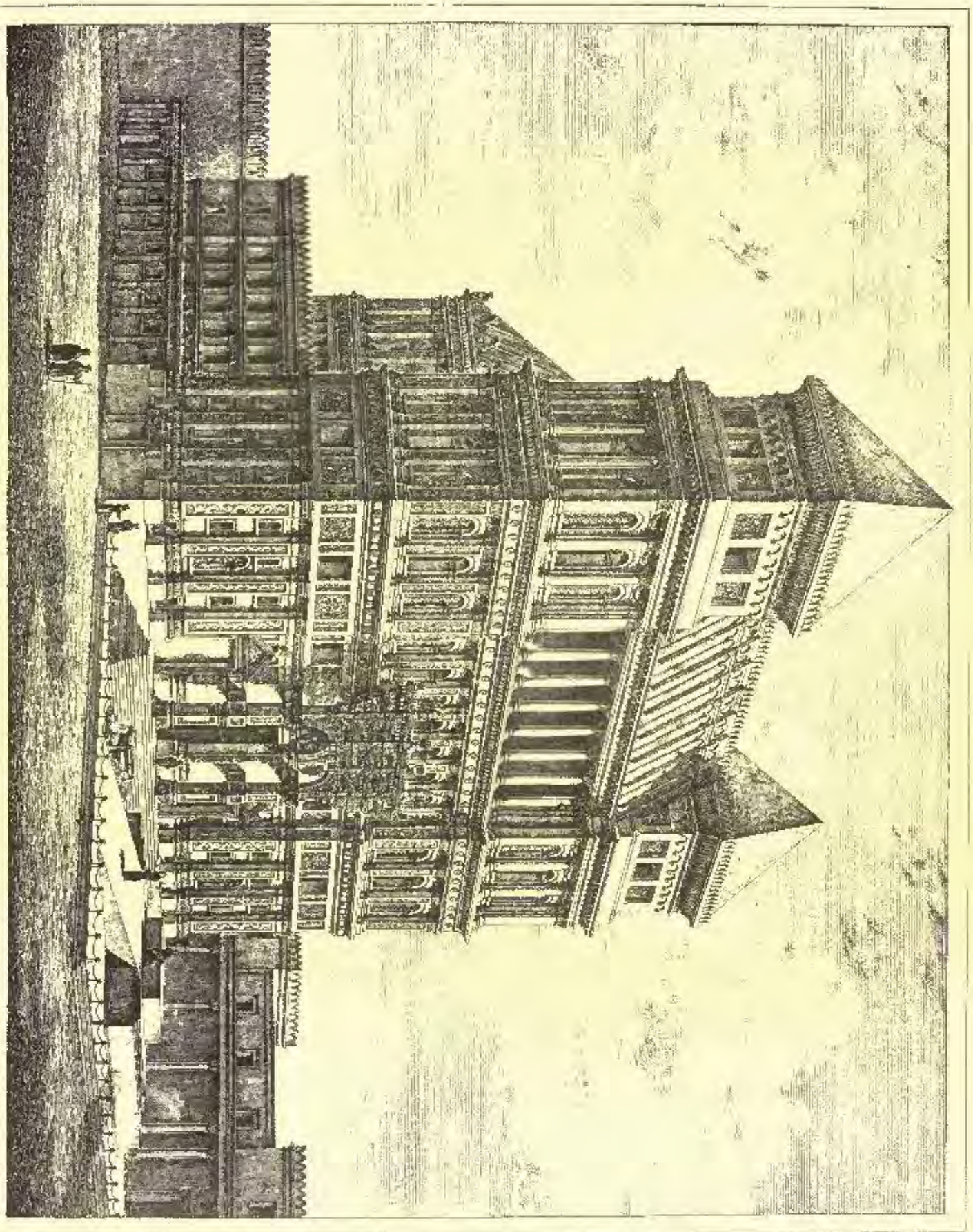


THE HELIOTYPE PRINTING Co. 120 DEVONSHIRE ST. BOSTON.


SEMI-DETACHED HOUSES: DORCHESTER DIST: BOSTON.
JOHN A. FOX, ARCHT.
1ST FLOOR
LIVING R.
DINING R.
KITCHEN



The Heliotype Printing Co. 220 Lincoln St. Boston



The Temple of Jerusalem, as rebuilt by Herod: restored by James Fergusson, F.R.S.

TABLE NO. 1.

(Three kilograms wood.)—Time, May 24, 1878.

	Experiment No. 1. Without Reflector. Outside Air from 14.5° C. to 13° C.									Experiment No. 2. With Reflector. Outside Air 18° Centigrade. Experiment began 2.25 P. M.							
Hours P. M.	Temperature at Top of Chimney.	Velocity of Draught by Anemometer in Meters.	Cubic Meters of Air passing through Chimney.	Difference between External Air and Air at Top of Chimney.	Equivalent in Cubic Meters raised 1° Centigrade.	Temperature of Flue half-way up.	Difference between External Air and Air in Middle of Flue.	Equivalent in Cubic Meters raised 1° Centigrade.	General Remarks.	Temperature at Top of Chimney.	Velocity of Draught by Anemometer in Meters.	Cubic Meters of Air passing through Chimney.	Difference between External Air and Air at Top of Chimney.	Equivalent in Cubic Meters raised 1° Centigrade.	Temperature of Flue half-way up.	Difference between External Air and Air in Middle of Flue.	Equivalent in Cubic Meters raised 1° Centigrade.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	17.5	78	5.20	2	8.40	17.5	2	8.40		30	73	5.20	7	22.40	29	7	22.40
1.1	18	88	5.86	2.5	10.55	18	2.5	10.55		28	240	16.00	12	74.40	40	12	74.40
1.2	18	98	6.41	3.5	14.45	18	3.5	14.45		27.5	272	18.13	12	84.40	40	12	84.40
1.3	18	103	6.93	4.5	18.68	18	4.5	18.68		27	295	19.66	11	82.50	39	11	82.50
1.4	18	108	7.20	4.5	19.00	18	4.5	19.00		27	304	20.26	11	82.50	39	11	82.50
1.5	18	114	7.60	4.5	19.00	18	4.5	19.00		27	304	20.26	11	82.50	39	11	82.50
1.6	18	118	7.86	4.5	19.00	18	4.5	19.00		27	304	20.26	11	82.50	39	11	82.50
1.7	19	121	8.13	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
1.8	19	124	8.26	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
1.9	19	126	8.40	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
1.10	19	128	8.53	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
1.11	19	130	8.66	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
1.12	19	132	8.80	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
2	19	134	8.93	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
2.1	19	136	9.06	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
2.2	19	138	9.20	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
2.3	19	140	9.33	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
2.4	19	142	9.46	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
2.5	19	144	9.60	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
2.6	19	146	9.73	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
2.7	19	148	9.86	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
2.8	19	150	10.00	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
2.9	19	152	10.13	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
2.10	19	154	10.26	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
2.11	19	156	10.40	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
2.12	19	158	10.53	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
3	19	160	10.66	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
3.1	19	162	10.80	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
3.2	19	164	10.93	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
3.3	19	166	11.06	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
3.4	19	168	11.20	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
3.5	19	170	11.33	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
3.6	19	172	11.46	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
3.7	19	174	11.60	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
3.8	19	176	11.73	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
3.9	19	178	11.86	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
3.10	19	180	12.00	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
3.11	19	182	12.13	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
3.12	19	184	12.26	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
4	19	186	12.40	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
4.1	19	188	12.53	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
4.2	19	190	12.66	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
4.3	19	192	12.80	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
4.4	19	194	12.93	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
4.5	19	196	13.06	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
4.6	19	198	13.20	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
4.7	19	200	13.33	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
4.8	19	202	13.46	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
4.9	19	204	13.60	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
4.10	19	206	13.73	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
4.11	19	208	13.86	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
4.12	19	210	14.00	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
5	19	212	14.13	5	23.50	19	5	23.50		27	304	20.26	11	82.50	39	11	82.50
			598.8		13790.91			13339.40				751.8		3081.10			3074.08

In column 9 of the preceding table the italic capitals refer to the first experiment, while the small italic letters refer to the second experiment.

A, fire lighted; *B*, full blaze; *C*, fire declines; *D*, fire faint; *E*, fire out; *F*, no more heat in cinders.

a, fire lighted; *b*, full blaze; *c*, fire declines; *d*, fire faint; *e*, fire out; *f*, no more heat in cinders.

By columns 2 and 12 we see that before the fire is lighted a ventilating draught of 78 meters per minute is caused by a difference of but 2 or 3 degrees in the temperature of the air in the chimney flue or house, and that of the outside air. But as this difference increases after the fire is lighted until it reaches 70° and 75°, as given in columns 4 and 14, we find the velocity of the draught rising to 285 meters per minute. Thus we have a chimney throwing out hot air raised nearly to the boiling point of water at the rate of 285 meters or nearly 1,000 feet a minute! Yet in some of the chimneys tested on the Back Bay the waste was found to be much greater, one chimney giving out heated air at the rate of over 1,600 feet per minute raised about the boiling point! What might the saving be, if all this heated air could be separated from the smoke, partially cooled or diluted with fresh cool air, and brought into the house for use!

Returning to our table we find by columns 6 and 16 the temperature of the draught at the middle of the flue and, by calculation, an average of 885 heat units absorbed in the upper half of the chimney.

Now we know that the heat generated by our fuel is of two kinds, of which one is given up to the air supporting combustion, and passes entirely away with this air up chimney in combination with smoke and vapor; while the other, and by far the smaller part, is sent off from the fire in rays in all possible directions. This latter part may be considered as *uncombined* heat, or heat combined only with light as distinguished from that combined with smoke and air. Thus only the *radiated* heat of the fire is used in our rooms. The experiments of Peclet show that the radiating power of wood is, under the best possible circumstances, when the rays are all collected, only 23 per cent., leaving 77 per cent to pass off with the air of contact. Therefore $23 \times 10{,}770 = 2{,}477$ units radiated in the case of our 3 kilograms of wood.

In the average fire-place only one-third of these rays, or in our case 826 units, pass directly into the room, the rest falling upon the back, sides, or bottom of the fire-place, or entering the flue through the throat of the chimney.

J. P. PUTNAM.

THE ILLUSTRATIONS.

THE TEMPLE OF HEROD AT JERUSALEM.

WE publish to-day a restoration of the Temple of Jerusalem as rebuilt by Herod, from a drawing by Mr. Fergusson, published in the *Building News*. A greatly reduced copy of the same drawing formed the frontispiece of his work on the "Temples of the Jews," to which the reader is referred, as there the data on which the restoration is based are set forth in detail, accompanied by sections and elevations to scale, with the illustrations and quotations necessary to render its various parts intelligible. The great difficulty of a restoration of this celebrated temple is that the Jews probably aimed at producing a building which should be 100 cubits (150 feet) in length, 100 cubits in breadth, and 100 in height, without being a cube, and as there is every reason to believe that they accomplished this, no restoration can be accepted that does not take these dimensions into account. But more than this, both the book of Chronicles and Josephus distinctly assert that some part, at least, of the Temple attained the unusual height, in these days, of 120 cubits, and this is stated with so much circumstantial detail by the latter authority, that it can hardly be overlooked. All the architectural details used in this restoration are copied from examples which are contemporary with Herod's Temple, or at least nearly so. The two pinnacles of the façade, for instance, are adopted from the monoliths now known as the Tombs of Absalom and Zacharias, exactly opposite the Temple in the Valley of Jehosophat, and probably of about the same age as the Temple. The pillars of the façade are copied from those of a small copy of the Jewish temple at Siah, in the Houran, which was undoubtedly of the same age. The vaults under the Aksah, which were part of the substructure of the Temple, and Herod's own burying place, now known as the Tombs of the Kings, and other sepulchres around Jerusalem, have all afforded hints for the details employed. In fact, as Mr. Fergusson points out in the work above referred to, we now know with tolerable accuracy what the style of architecture was which was practised in Syria between the age of Pompey and the destruction of the city by Titus, and the details of that style are the only ones that are, or can be, employed in any attempt to restore the Temple of Herod. They are not such as modern taste will approve, nor such as previous attempts at restoration would lead us to expect, but they are the only ones that can at present be adopted in any design which purports to represent the Temple as it was in its days of greatest magnificence. The restoration is therefore interesting; nevertheless, we are inclined to doubt whether the builders of the Temple would recognize it.

THE ALLEMANIA CLUB HOUSE, CINCINNATI, OHIO. MR. JAMES W. M'LAUGHLIN, ARCHITECT, CINCINNATI.

This building, situated on the corner of Fourth Street and Central Avenue, is being erected by Reuben R. Springer, Esq., mainly for the use of the Allemania Society. It has a frontage of 70 feet on Fourth Street by 100 feet on Central Avenue, and will be 74 feet in height to the top of the cornice. The fronts are of Buena Vista freestone, portions being roughly tooled and the remainder rubbed smooth. The entrance hall and upper stories will be finished for club purposes. The large hall on the third floor will 25 feet high, and be provided with a stage, having scenery, dressing-rooms, etc., for the theatrical representations of the Allemania Society, concerts, and receptions.

SEMI-DETACHED HOUSE, DORCHESTER DISTRICT, BOSTON, MASS. MR. JOHN A. FOX, ARCHITECT, BOSTON.

This house is now building for Mr. Franklin King, on Trull Street, in Dorchester. The two tenements are separated by a solid brick wall.

COTTAGE AT CLAYMONT, DEL. MR. T. P. CHANDLER, JR., ARCHITECT, PHILADELPHIA.

The frame is of hemlock, boarded diagonally, covered with heavy sheathing paper, and then with the usual white pine clapboards. The roof is covered with black slate. The shingles under the eaves are painted red, and the remainder of the house a deep, rich brown. There are four rooms on the first floor, six bed-rooms, large bath-room, china-closet, trunk-rooms, etc. The house is heated by a furnace, and has open fireplaces.

NOTES ON ARCHITECTURE IN PALESTINE.

THE remains found at ancient Jewish sites include caves, cisterns, rock-cut scarps, and rock-cut tombs. It is evident that from an early period the inhabitants of the country were skilled in rock-cutting, and that they lived in caves, as the peasantry still do to a great extent. There are often rude tunnels cut into the hillside, from which the water of a spring comes forth. The cisterns are generally bee-hive-shaped, with a man-hole at the top, and from ten feet to fifteen feet deep. Rock-cut tanks of great size are also found at some of the old sites.

The most famous example of a rock-scarp is that which formed the

foundation of the wall of ancient Jerusalem, at its southwest angle. This was bared to its base in 1874, by Mr. Mandalay, M. I. C. E., and proved to be in one part fifty feet high. At the corner is a projection twenty feet square, the base of a tower, with a rock-cut stair from the outer platform of rock; at the east end (as far as excavated) is a second tower and stair. Cisterns are cut in the top of the scarp, and there is, in one part, a ditch in front of it. This solid foundation for the ancient wall reminds us of the solid bases of the great towers, its Hippicus and fellows, mentioned by Josephus. Another rock foundation, forty feet high, exists at the northwest corner of the Haram, and this is scarped in the same way with a vertical face, rudely dressed with some kind of pick.

Fortifications of this kind are found in many parts of Palestine. The village of Bittîr (Bether) stands on such scarps, partly natural, partly artificial, and the same method of defending a site is noticed by Josephus in describing Samaria.

The rock-cut tombs are, however, of yet greater interest, and a large number were planned throughout Palestine by the survey party. There is no reasonable cause for doubting their great antiquity, for the typical form of these tombs is described in the Talmud, and no examples are known which can well be ascribed to other nations than the Jews. The only Hebrew inscriptions discovered during the survey were found over the doors of these tombs, and in several cases the golden candlestick was represented on the walls. The face of the rock in which the tomb is hewn is generally vertical, but is sometimes cut back to form a square open court in front of the tomb door. The door-way is very small, two feet six inches, or even only two feet wide by three feet in height. It is closed in various ways; sometimes by a stone door, swinging on hinges, and secured by a lock,—hinges and lock having now been removed, being probably of metal; sometimes by a slab of stone, resting against an inner rim, and secured by a horizontal bar; occasionally by a door which slides up and down; while sometimes the entrance is built up with four or five blocks. The chamber within is four-sided, ranging from six feet to thirty feet in length, and from seven feet to ten feet in height. A stone bench, about two feet high and wide, often runs round three sides, and steps lead down from the door to the floor. The roof is generally flat, but sometimes cut to a low arch, or to a triangular cross-section. The walls are rudely finished with a pick, or some pointed instrument, and the shape is scarcely ever truly rectangular.

The bodies were deposited in long tunnels, which run in from the walls of the chamber, and they lay with the feet towards the centre, and the head furthest in, at right angles to the wall. These pigeon-hole graves are called *kokim* (plural of *kok*) in the Talmud. They range from four feet or five feet (probably for children) up to seven feet in length, and from two feet to three feet in width and in height. The end opening into the chamber was closed by a stone slab, which was plastered over, and in some cases the interior was packed with chips of stone for a distance of one foot or more. The roofs of the *kokim* are sometimes flat, sometimes pointed, and very generally arched out into a semicircular tunnel-vault.

The rude stone towers appear to have been intended—like the smaller and less solid ones now built—to guard the orchards. They are about fifteen feet square, and rather more in height. The corner-stones are sometimes five feet long, and are occasionally dressed, while the rest are quite rude. The lintel-stone of the door is also sometimes well dressed. There is no mortar in the walls, which are very thick. The roof is composed of slabs, seven feet or eight feet long, resting on the walls, and sometimes on a central pier of similar construction. In one case a semicircular arch of well-dressed stones was thrown from wall to wall to support the slabs. Six or seven of these towers will sometimes occur close together. The great size of their stones indicates their antiquity, as the natives never employ such large blocks in building. Such towers are noticed in our Lord's parable of the vineyard (Mark xii. 1).

To the Herodian period the greater part of the megalithic masonry of the Temple walls is now generally ascribed. It has been found that the curious criss-cross dressing of these stones occurs also on the voussoirs of the Tyropœon Bridge, which does not date earlier than the time of Herod's Temple. An interesting discovery has also been made recently with regard to these walls. In 1873 Lieutenant Conder reached the wall at a point previously unexplored near the northwest corner of the Haram, and found the ancient masonry, *in situ*, from the rock to a level higher than that of the inner court. The appearance of the wall is shown in a wood-cut in "Tent Work in Palestine" (vol. i., p. 316). At the level of the interior ground it is set back, with a bevelled edge to the stones, and piers are left projecting one foot six inches. This detail is also observable in the walls of the Hebron Haram, which Mr. Fergusson attributes to the Herodian age. The wall at Jerusalem was also found to have a batter below the level of the bevelled stones, each course being set back six inches behind that immediately under it. The horizontal drafts of the stones were in this part six inches wide, the vertical ones being three inches. The object appears to have been to give a more equal effect to the eye. Where the wall is flush, the draft is three inches on each of the four edges of the face of the stone.

The tombs of this later period are especially worthy of notice. They are distinguished from the earlier *kokim* tombs, partly by having sarcophagi under arcosolia at the sides of the chambers, instead of *kokim*; partly by the large porches with rock-cut pillars supporting their roofs. The capitals of the pillars have volutes resembling those of the Ionic order, but the attached pilasters at the corners of the porch are generally of the Doric order. The rock inside the porch (which measures twenty feet to thirty feet in width, by about ten feet in depth) is often cut in imitation of drafted masonry. Sunk places, apparently for metal tablets with inscriptions, such as the Jews employed in the second century B. C., are also found, but only one inscription was recovered, being rudely painted in red, and consisting of the Greek word ΠΑΡΘΕΝΗΣ.

A rock-cut frieze generally occurs above these tombs. The most famous example is that of the tomb of Helena, north of Jerusalem, dating in the first century B. C., according to Mr. Fergusson. In this and in many other examples there are triglyphs with guttæ, and bunches of grapes between. In one case, the door-way had a design of the Greek fret round the jambs and over the lintel, and a rude representation of grapes and vine-leaves above. In many instances rosettes, wreaths, and geometrical patterns, very well executed, occur between the triglyphs.

New examples of very fine character were found by the survey party at Deir el Durb, in Samaria, and again south of Hebron.

The *loculus* tomb, with a rock-cut sarcophagus under an arch, can now be shown to have been used by the Jews, and to be later than the *kokim* tombs. Numerous transition examples of great interest have been found. In some cases, the outer or older chamber had *kokim*; the inner or newer chamber, *loculi*. The *kokim* were often destroyed in making the *loculi*, and in some cases both *loculi* and *kokim* occurred in one chamber.

The well-known rolling stone, closing the tomb door, is almost always found in connection with the *loculi*. Only two instances of *kokim* tombs with a rolling stone have been found. This agrees with its use in the Holy Sepulchre, which cannot have been of the class of the *kokim* tombs, as the angels sat at the head and at the foot of the grave. The stone is *in situ* in the tomb of Helena at Jerusalem, standing in the sloping groove in which it rolled. These stones weigh about six hundredweight, and are generally three feet in diameter. They moved like a cheese rolling on its circumference, and had to be pushed up hill to open the door.

It is worthy of notice that at Umm el 'Amed the pillars of the synagogue were one hundred and sixty inches high, their capitals eight inches high, and the bases sixteen inches. If the cubit was sixteen inches long (as may be deduced from Maimonides), the pillars were thus ten cubits high, the capitals half a cubit, the bases a cubit.

Among the great public works of the Herodian period may be noted the two fine aqueducts leading to Cæsarea, partly rock-cut and partly of earthen pipes carefully joined, resting on a concrete foundation in a masonry trough, and supported on five round arches, with a double ring of voussoirs. Where tunnelled through the hill, these aqueducts are reached by winding stairs, cut in the rock; no doubt intended to facilitate the excavation of the tunnel in the first instance, and for drawing water in the second.

From the time of Queen Helena's pilgrimage to Jerusalem, and the building of Constantine's basilica, in 333 A. D., down to the year 636 A. D., when Palestine fell into the hands of the Caliph Omar, a large Christian population spread over the country, and numerous monasteries and churches were erected, especially in the south, where large Christian villages existed, according to St. Jerome. The architecture of this period is very distinctive in style, and the large majority of the ruins now found belong to this epoch.

We have unfortunately only two dated examples of this period in Palestine itself, though in Northern Syria Du Vogüé has examined many splendid structures of the same style, some of which are dated with exactitude. In Palestine we have Constantine's basilica, built about 333 A. D., at Bethlehem, and the fortress on Gerizim, built by Justinian in 533 A. D., round the octagonal chapel erected by Zeno in 474 A. D. In the first we find columns, with capitals of the Corinthian order, having the cross on each boss between the volutes. These support a very simple cornice, and from above the columns in the central aisle rises a clear-story, once pierced with windows. The capitals are all of one design, and the columns are uniform in dimensions and detail.

In the second example we find the whole of the exterior walls, built of drafted masonry of a peculiar kind, which is found very commonly in the walls of the early chapels and monasteries. The stones are extremely irregular in dimensions, and the courses are not always carried the whole length of the wall at one level. Very narrow courses sometimes occur near the foundations, and high courses above. The stones vary from two feet to ten feet in length, and are generally two feet to two feet six inches in height. The draft is deeper cut than that of the Herodian masonry at Jerusalem, and is extremely irregular, being sometimes six inches wide at one side of the stone, and three inches or four inches on the other. The boss of the stone is not always of rectangular form. The dressing is rude, and appears to have been executed with a pointed instrument. The boss is always dressed, and projects about two inches. This masonry was evidently quarried for the buildings in which it is now found, being adapted for its present use, and occurring also in arches and lintel stones of a size suitable to the width of the entrances beneath.

Another distinctive feature of the style is the character of the vaulting and arches. The stones are smaller than those in the walls. The keystones are very narrow, the haunch stones wide, and the intermediate voussoirs graduate in width from the one to the other.

This peculiarity is found invariably in all buildings of the period. The vaults are semicircular tunnel vaults, and groined roofs never occur, nor are pointed arches ever found.

One of the finest examples yet examined is the monastery of Deir el Kŭlah, in Samaria. The cloisters remain almost perfectly preserved, with exception of the roof. The doors have flat lintel-stones over them, upon which the cross is always cut. Sometimes elaborate geometrical designs surround it, and over one door the conventional representation of Calvary occurs beneath it. Over these lintel-stones low relieving arches occur. In one case the stones above were only hollowed out, and no structural arch existed.

The masonry of the interior is not drafted, but the outer walls, which rise against the face of the cliff, are of large drafted masonry. In the chapel a simple cornice runs round the walls, and above the small window in the apse this cornice is deflected into a semicircular arch. In this building we thus find two of the characteristic features of the architecture of the Golden Gateway reproduced, but, unfortunately, no date has yet been found in connection with the Samaritan example. The arches and vaults in this building reproduce the peculiarities above enumerated.

The heavy lintel-stones, ten feet to fifteen feet long, which were used in the Byzantine monasteries, are often the only traces left of the building, the smaller stones having been carried away by the peasantry. In one case a Greek inscription was found on a lintel, which was translated, — "This is the gate of the Lord, the righteous shall enter in."

It may be noted that the vaulting of the Single and Double Gateway passages, and of the Twin Pools, and two others of the Haram vaults, show the peculiarities of the Byzantine arching, above described.

It appears that the form of tomb used at this period was the same as that above described, used in the later Jewish times; but the Christian examples are never found in cemeteries in which *kokim* tombs occur.

At Beka, in Samaria, a tomb of this kind was found with the Greek inscription, ΕΙΣ ΘΕΟΣ ΜΟΝΟΣ, "One God only," and a date which appeared to be probably 332 A. D. In Jerusalem another example was found ornamented with large crosses in red paint, and the letters A and Ω at the heads of the graves. In the valley south of Jerusalem the same class of tomb is found with Greek inscriptions, "The monument of certain persons of Holy Sion (a Church so-called) from Rome," and again, — "The excellent monument, the tomb of Amarulph of Germany."

The fine tomb, discovered in 1876 in Galilee, the façade of which is given in a former number of the *Builder* (p. 644, *ante*), is also of this period, and with two others is close to a Byzantine church. The façade is covered with a grape-vine, cut in very hard rock, having birds in the branches. On each side of the door is an illegible Greek inscription. The interior has small attached columns, with spiral fluting and rudely-cut classic capitals. The vine is again cut on the walls, and over each sarcophagus at the back is a boss on which a cross is cut in relief. It is thus clear that the cross is as old as the tomb itself. On the side walls of the open court, before the façade, two lions are rudely represented, and two smaller animals, apparently lambs, with birds and flowers.

Careful plans, sketches, and sections of this curious monument were made by the survey party. A tomb close by has also a cross over the door flanked by two birds in relief. The town where these tombs were found is called Shefa Amr, and was the ancient Shafram, a place where the Sanhedrim sat in the second century A. D., and which was afterwards considered by the Crusaders to be the home of Zebedee. The ancient Jewish cemetery is at some distance from the church and from the Christian tombs.

To this period also several fine structural tombs throughout Palestine probably belong, having domed roofs springing from pendentives. — *The Builder.*

L'ÉCOLE DES BEAUX-ARTS.

L'École nationale et spéciale des Beaux-Arts at Paris, founded in 1648 for the teaching of architecture, sculpture, painting, engraving, and gem-cutting, is, as its name indicates, a public institution, being under the supervision of the Director of the Fine Arts. The school is open to all without distinctions of nationality; and ranking as it does, especially in the department of architecture, as probably the best institution of its kind anywhere, it attracts to itself students from nearly every country of the world. The applicant for admission to the above department is required to have two letters of recommendation, one from the minister of his country in Paris, and the other from the professor in whose *atelier* he is working or expects to work. The inscription as candidate for admission takes place a few days before the examinations, which occur twice a year, in March and July. The aspirants are first tested in cast-drawing, being allowed twelve hours in which to make a shaded drawing from a plaster cast of an antique ornament. The requirements are very decided in this respect, and while a finely finished drawing is not called for, still the student is required to show that he has the ability to make a correct outline, and can faithfully express the lights and shades. The examination in architectural designing and drawing which follows, takes place *en loge*, as it is termed, each aspirant being placed in a stall by himself, with the programme proposed before him, and not allowed to leave the room until the task is completed. As twelve hours is allotted for this also, from 9 A. M. to 9 P. M., the student is expected to bring a lunch with him. The supposition on the part of the authorities probably is that the applicants shall keep reasonably quiet, and work out their ideas independently; but since the average French student is a being mortally opposed to quiet or close application, and as the *loges* are separated only by thin board partitions, and are entirely open towards a central passage, the conditions are often not the most favorable for thoughtful work. The projects given vary, of course, each year. The past July it was a "*piscine dans un établissement thermal.*" The drawings are required to be in line only, the plan to a scale of four millimeters per meter, the elevation double. The design is expected to be strictly classic, with one of the orders used in correct proportions, Vignola being assumed as standard. Many of the drawings sent in are finished in color, but that is entirely optional, the requirements calling more for a sketch than a finished drawing.

At this point in the examinations, judgment is passed upon the work already accomplished, and only those whose drawings are satisfactory are allowed to try the examinations in mathematics and history. These consist in mathematics of first a written examination *en loge*, followed by an oral examination by the professor in charge. The topics embraced are, arithmetic and its applications, algebra as far as equations of the second degree, and geometry, plane and solid, such as is usually taught in the high schools of the United States. Also an amount of descriptive geometry about equal to what is contained in the first seventeen problems of Church's treatise on the subject. In history, the examination is altogether written. Four questions are given, two from ancient history and two from modern, and the student is required to answer but one from each. The questions are quite general, only the leading dates being called for. The examinations are of course all in French, except the history, which may be written in English, if so preferred.

This is all that is required to enter the department of architecture. As will be seen, the examinations are not difficult; but the school evidently proceeds upon the principle, that what a man knows at all, he should know well, for the marking is so close that a large number of the aspirants always fail to pass. This year, out of ninety-four who were first inscribed, but thirty have been admitted, forty-five dropping out on drawing and designing alone.

The system of instruction employed keeps the *ateliers*, to a certain extent, distinct from the school proper. To enter one of these it is necessary only that the applicant be satisfactory to the professor in charge, he being the sole judge of the requisite qualifications. The instruction in the school is entirely gratuitous, no fees of any kind being required. On entering the *atelier*, however, a sum of thirty to forty francs is paid for the use of boards and T-squares, and a fee of five francs per month is called for to meet incidental expenses.

C. H. B.

[During the past three years we have had occasion to explain at length to more than one questioner what is the course of instruction in architecture at the École des Beaux-Arts and what preparations are necessary to ensure passing the entrance examinations. Six months ago, our correspondent tells us he was unable to obtain the information he now sends us, and as there may be others who desire to be better informed on the subject it seems well to supplement the information contained in the foregoing communication by a few more details.

Of the two letters of recommendation mentioned, one must come from the *patron* of the *atelier* where the student is to study and work. In the choice of an *atelier*, one is usually influenced by the advice of friends who have studied in one or another of them. There are at the École itself only three *ateliers*, under the charge of MM. André, Laisné, and Gaudot; these are generally well filled, because, being in the school buildings, they are more accessible to the library and collections, and because a certain prestige attaches to them as being under the immediate patronage of Government, partly, too, because they are what are known as *ateliers à mention*, that is, *ateliers* whose pupils are sometimes thought to obtain an undue share of recompenses. These *ateliers* are not much affected by Americans, possibly because in them hazing is practised with some severity. Besides these, the legitimate workrooms, there are eight *ateliers extérieurs* which have a semi-official but well-recognized connection with the École. These are under the charge of M. Coquart, M. Ummel, MM. Girain-Lebas, M. Guénepin, MM. Moyau-Joyau, MM. Pascal-Questel, M. Train, and M. Vaudremer, men of high standing in the profession, and without exception, we believe, men who have obtained the *Prix de Rome*.

Once admitted to an *atelier* the first thing to do is to obtain a reasonable control of the language, and the next is to brush up one's knowledge of mathematics. The best way of doing this is to attend the lectures of M. Clapet, 10 Rue des Beaux-Arts, who has a semi-official connection with the École, and who for the absurd price of ten francs per month goes over the necessary ground in three or four months with the utmost thoroughness. If the aspirant is well grounded in mathematics this course is not necessary, for since the same terms are constantly being repeated in mathematical demonstrations a few private lessons is all that is really needed, but the lectures are admirable training in that they accustom the aspirant to the sound of his own bungling French.

From the secretary's office can be obtained a printed programme or syllabus which contains a list of the topics which will form the basis of the examination. It is well to bear in mind that this syllabus is adhered to strictly; for the authorities have adopted wisely as their standard a minimum of information known with precision rather than a superficial knowledge of a wider range of subjects. Yet, simple as the requirements are, it is no uncommon thing for a Frenchman to fail at four or five successive examinations, a fact which is due probably to the want of even ordinary education among Frenchmen outside of Paris. A foreigner on the other hand rarely gets turned back more than once.

In order to prepare, if preparation is necessary, for the examination in drawing from the "round," it is well to attend some of the free evening drawing schools, where the aspirant should make a point of practising with the pencil and crayon point, for the examiners give to a mediocre drawing in pencil a higher mark than to a good drawing finished with the *estompe*. In the examination in architectural design it is safest to avoid seeking anything *bizarre*; accurate mediocrity will answer every purpose, and the time that can be saved by not seeking for striking combinations of plan or elevation can be to good purpose spent on the rendering of the drawings.

The inspection of the free hand and architectural drawings made at this period usually eliminates more than half of the applicants, while the examinations in mathematics and history, which follow after the lapse of a few days, are apt to eliminate fifty per cent of the remainder. EDS. AMERICAN ARCHITECT.]

BLACK MORTAR.

WESTERLY, R. I.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir, — In reference to the query about "black mortar" in the *Architect* of September 14, I would say that we use here a preparation called mortar black, put up by the Walpole Color Company, of Walpole, Mass. The preparation is "patented," and, not having analyzed it, I am unable to state what it is composed of. The color is a fresh, rich black, which holds for years. Doubtless the gentleman can obtain the information desired by addressing the Walpole Color Company, Walpole, Mass.

Very truly yours, J. IRVING MAXSON.

THE OWNERSHIP OF DRAWINGS.

NEW YORK, September, 1878.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir, — We believe it has been legally decided that all plans and working drawings furnished by an architect for the erection of any building belong to him, and not to his client. Will you be kind enough to inform us of any such decisions, either by letter or through the columns of the *American Architect*?

Yours very respectfully, THOM & WILSON.

NOTES AND CLIPPINGS.

THE WASHINGTON MONUMENT COMMISSION. — There was a meeting of the joint commission on the Washington monument September 25 at the White House. There were present President Hayes, Mr. W. W. Corcoran, Col. Casey, General Wright, assistant to the chief of engineers, U. S. A., Architect Hill, and Architect Clarke. The plan for strengthening the foundation of the monument, prepared by Col. Casey, was read and discussed. It was not formerly adopted, though it was generally approved. The plan, which proposes to strengthen the foundation by underpinning and lateral extensions of concrete would, to be carried out, necessitate an expense of more than the $36,000 appropriated for the work. The question was raised whether, under the act, any of the money appropriation made for the completion of the monument proper can be expended on the base. It was decided to refer the question to the Attorney General for an opinion on the subject. Another meeting will be held next Saturday, when final action on Col. Casey's report is expected, and the work of the commission will be mapped out.

KEROSENE RESERVOIRS. — The greater part of the petroleum and mineral oils intended for the consumption of Paris is stored in the docks of St. Ouen, where floating reservoirs, each of the approximate capacity of one hundred barrels, have long been in existence. The constant increase in the consumption has made it necessary to enlarge the storage accommodation; a large number of reservoirs have recently been added, of a total capacity of about nine hundred thousand gallons, and the prospect is that more room will soon be required.

These reservoirs are of plate iron, twenty-eight feet in diameter by some seventeen feet in height to the spring of the arched cover; the thickness of the bottom and of the lowest ring of plates is one quarter of an inch, and of the top-rising three sixteenths of an inch, while the thickness of the cover is only one tenth of an inch. They are filled through openings at the top, three feet three inches in diameter, and, being all in one line, are connected by a bridge or footing, which extends from one extremity to the other, a distance of four hundred and twenty feet. They rest upon a platform of wood, laid upon a rubble foundation. The petroleum, when brought on shore from the vessels in the river, is at first deposited in the floating reservoirs, which are partly submerged; from these it is pumped into the reservoirs, and thence drawn off through the pipes into barrels. The total weight of these wrought-iron reservoirs, fourteen in number, is one hundred and fifty-one tons.

ARTIFICIAL STONE. — A new stone is now being introduced in Wilmington by the patentee, Mr. George Richardson. The two ingredients are sand and cement. The sand used is that which is found along the Delaware, and that which is used in Chester comes from Pennsgrove. The cement used is the ordinary hydraulic cement. The cement rock is submitted to the process of burning in order to expel the carbonic acid gas, which puts it in a condition for grinding, after which it is ready for use. The sand and cement are mixed in fixed proportions for a mortar of a dark gray color. This is then placed in moulds whose size and shape accord with the article to be produced. These moulds are of wood for hitching posts, window caps, window sills, door-sills, etc., but for draining pipes are of cast iron. The substance when placed in the moulds is in a soft condition and undergoes a thorough packing. It is then removed and is ready for the hardening process. The articles are placed in an air-tight chamber ten feet square, and carbonic acid gas is introduced to harden them. The gas is generated by burning charcoal in a common coal stove, and in passing into the chamber, first goes through cool water to reduce the temperature, as it would otherwise injure the cement. This gas is so rapidly absorbed as to keep up a draft from the stove to the chamber, and as long as the absorption goes on the stone continues to harden. After two or three days the articles are immersed in a tank of water immediately under the floor of the apartment, which makes them harder. They are then ready for all uses that they are intended for.

REVERE MEMORIAL. — A tablet commemorating the hanging of the lantern in the old North Church, Boston, April 18, 1775, by Paul Revere, has been put up in that church.

STRANGE STATEMENTS ABOUT YELLOW FEVER. — A singular fact is that the first death from yellow fever occurred on the 21st of July, on a street well paved and in a neighborhood of the wealthy — a fact the more wonderful when it is remembered that New Orleans has very few paved streets, and, further, that by far the largest number of deaths are on the streets well paved and near the Mississippi River, while out in the rear portion, where the draining canals are reeking with filth, where dead dogs and cats are floating around, in a green scum nearly two inches thick, with the hot sun pouring down upon them at a temperature of about ninety degrees Fahrenheit, there has not been a single death from yellow fever. Again, in the Third district of this city, where there were over five hundred deaths from the yellow fever in 1870, not a death has occurred so far, and the same may be said of the Fifth district, situated on the opposite side of the river, surrounded by swamps and very filthy. — *N. Y. Herald.*

BRONZE STATUE. — In front of the store of Mason & Co., No. 1202 Chestnut Street, Philadelphia, there has been placed a bronze statue of the late William Woodward, of Cincinnati. The figure, which is of colossal size, was modelled by Mr. J. A. Bailly, and was cast at the bronze foundry of Bureau Bros. & Heaton, No. 909 North Ninth Street. The statue will be removed in a few days to Cincinnati, where it will be unveiled about the first of October.

ROMAN REMAINS IN ENGLAND. — Walbrook, England, has, within the last quarter of a century, been the scene of many interesting discoveries of Roman remains. To these has now to be added a "find" which has taken place at No. 9 in that thoroughfare. The premises are about to be rebuilt and enlarged; excavations have been made during the past few days at the rear, and the workmen have come upon several objects of interest to the archæologist. One of these is a well, stated to be of Roman origin. It is about 22 feet in depth, the upper portion of the circle being constructed with Kentish rubble, and the lower, to the extent of about 10 feet, being lined with chalk, without cement or other material between the courses. The water is said to have been very pure when the well was first opened by the workmen. A Roman jug, very light and curious, the lower portion of a wine or water cooler (the latter made of Purbeck stone), some pieces of tesselated pavement, etc., were also discovered.

THE "OLD BAILEY." — Newgate will not fall alone. The Old Bailey has been condemned, and a new block of buildings will take its place. Within the dock to be removed have stood Jack Sheppard, Jonathan Wild, and the poet Savage, whose biography was one of the best that Dr. Johnson wrote. It was in the Old Bailey that the regicides had their trial, but that portion of the original structure has disappeared. It is many and curious forms of law that the Old Bailey has seen come and go. "The hangman no longer," says the *Echo*, "sits down by the side of a prisoner halter in hand, as he did in 1669; and the awful warrants are no longer issued in shoals, as formerly, or in the 'good old days.'"

NEW YORK PAVEMENTS. — There are 328 miles of paved streets in New York south of the Harlem River, which may be classified as follows: Macadam, 22 miles; granite, 26 miles; trap block, 180 miles; wood, 14 miles; cobble, 83 miles; concrete, asphalt, etc., 3 miles. Of this nearly 150 miles consists of rotten wood, dilapidated cobble, worn-out and shapeless stone blocks.

THE CHINESE CANAL. — The Grand Canal of China is likely to share the fate of the Great Wall. This waterway was constructed by Kublai-Khan and his successors of the Yuen race, and is 600 miles in length. There are 10,000 flat-bottomed boats on this canal, and these are used in the transportation of grain. The *Echo* states that this great waterway is an enormous "white elephant," as it costs an enormous amount every year for repairs, the appropriations there, as elsewhere, not being entirely devoted to the purpose for which they are meant. Junks are delayed every month while channels are being dug for their passage. This year, for the first time since the construction of the canal, the grain from Nankin, with the consent of the Government, has been forwarded by sea, and this fact has impelled the Pekin authorities to consider the expediency of abandoning the canal as a commercial highway.

OPTICAL ILLUSION CAUSED BY INTENSE HEAT AND LIGHT. — Dr. Joshua Thorne narrates in the *Kansas City Review* the following facts which lately came under his observation at the rolling mills in that city: —

While looking at the eclipse of the sun July 29, I handed the glass to one of the mill "heaters." He at once told me he could see as well with the naked eye as with the smoked glass. I then tried another "heater," and he at once repeated the same statement. I then went to the rolling mill and tested every "heater," at his furnace. They all told the same story. I hunted up every "heater" in the town except two (who were not found), over twenty in all, and every one declared he could see the phenomenon, and all its phases, as well or better with the eye unshaded. I took the precaution to test each one by himself, told him nothing of what I expected, or of the testimony of others. I made no suggestions to any of them, but let each tell his own story. All told the same tale; one peculiarity all agreed to — the image in the glass was upside down from what they saw with the naked eye. They would describe many peculiarities of color which could not be seen by others with the aid of the glass. It should be remembered that the "heater" has to see his iron in the furnace while it is enveloped in a flame whose intense glare prevents unskilled eyes from seeing anything, an education of the eye peculiar to this class of workers, as no other class of workmen is exposed to the same degree of heat or light. In accordance with your request, I repeated the experiment of Ericsson, and submitted a spherical piece of iron, eight inches in diameter, to a heat of over 3,000° Fahr. It was carried to an almost melting point, withdrawn from the flame and placed on a stand. It had the appearance of a disk at all distances tried, up to over 100 feet. As seen by the chief engineer of the mill, myself and others, it was perfectly flat. The convexity did not appear; it was, while in this state, to all appearance no longer a sphere, but a disk. As the iron cooled off it resumed its original appearance of a sphere.

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CONTENTS.

SUMMARY: —
Government Inspection. — The Grand Jury on Elevated Railways. — The Question of Cheapness. — The Suppression of Thoroughfares. — A Railway on Vesuvius. — The Encouragement of Workmen. — The New York Society of Decorative Art's Lectures. — The Women's Carving School at Boston 121
THE EQUILIBRATION OF ARCHES 122
CORRESPONDENCE: —
Letter from London. — Letter from Chicago 123
THE ILLUSTRATIONS: —
Church at Oyster Bay. — Dining Hall in the Palace of the Grand Duke Wladimir. — House at Chiswick-London. — Reception Hall and Staircase in the Alemania Club House 125
THE RATING OF BUILDINGS 125
FRENCH PAINTING OF TO-DAY 126
AERIAL ECHOES 126
BURIALS AT ANCIENT ROME 127
THE AMERICAN INSTITUTE OF ARCHITECTS, NEW YORK CHAPTER 127
NOTES AND CLIPPINGS 128

THE facts that have come out concerning the boiler of the steamer Adelphi, which burst at Norwalk a short time ago and killed a dozen passengers or more, enforce the lesson of frequent building accidents, and show us again the precariousness of government inspection. The boiler had been inspected in June and certified as safe. Three months after, it was torn open by a pressure of steam which was less, the engineer declares, than it was allowed to carry. On examination it appears that the boiler was worn and patched and rusted away, into an obviously dangerous condition. A new patch had indeed been put upon it between the inspection and the accident, and still plates were left, it is said, which were worn to the thinness of pasteboard. One naturally asks, How came a government inspector to give a certificate to a boiler which was in a state to require patching in two months, and to burst in a month after that? And what sort of examination did he make? The inspector has been suspended, awaiting an investigation, and pending this we shall not know whether he complied with the letter of his instructions or not. The hydrostatic test prescribed by the regulations has never commanded confidence, for the plain reason that, like any straining test, it may itself permanently injure the structure it tries; but no working substitute has yet been devised for it. It is clear at least that all such tests are likely to be delusive unless they are supplemented by careful subsequent examination. Whether in the case of the Adelphi the boiler was tested by pressure or not, an inspection which did not discover that it would not endure two months' wear without repairs must be pronounced worthless. The fall of Mr. Livermore's unfinished dwelling-house on Broadway, New York, a short time before, is an indication among many that building inspections are often no better. A correspondent in another part of this paper suggests, in view of the overloading of buildings and the changes in their uses, that they should be rated and re-rated from time to time, like ships, for the amount of storage they are fit to carry. The suggestion is a useful one, and could doubtless do something to abate the dangers which are incurred through ignorance. Government inspections all tend, however, to one danger: they tempt owners to think that their responsibility is transferred to the government, or at least to act as if it were. Considering their fallible nature, then, it may be questioned whether they do not often do harm rather than good. They are necessary, nevertheless, and the only security is in having it thoroughly understood that they are simply precautionary, and by punishing both owners and inspectors alike with rigor when their carelessness leads to disaster.

THE Grand Jury of New York have, by a unanimous vote, declared that the Metropolitan Elevated Railroad of that city is "a most unfortunate mistake, and is a great calamity," — "a gross violation of the rights of property-owners and residents in the vicinity of the line." The jury do not indict the road, but they present it before the courts "as a public nuisance in its unparalleled invasion of private rights and of public comfort, safety, and health; and they earnestly request the court to lay this presentment before the Honorable Attorney General of the State, and before the Legislature when it shall assemble, in order that steps may be taken to redress an outrage which they are confident would never have been sanctioned had its enormity been realized." They do this unanimously, preferring the presentment to the last resort of a criminal indictment, and putting their trust in the courts and the Legislature to vindicate the rights of the people.

WE have no doubt that the Grand Jury are quite justified in their statement, nor that the building of the elevated roads was a mistake which would not have been allowed if its consequences had been realized beforehand; and that the invasion of private rights and the injury to health and comfort are such that, if they are not compensated, to call them an outrage is using language none too strong. Yet the roads are proved to be a great public convenience, and they, or some equivalent for them, must be accepted as a public necessity. The New York Elevated Road is reported to carry an average of nearly sixty thousand passengers daily, and the Metropolitan forty or fifty thousand, — perhaps together a hundred thousand. The *Tribune* says, perhaps a little cynically, "The sense of a selfish public will be that the few must suffer for the good of the many. Rapid transit roads are rendered a necessity by the conformation of New York Island, and no roads are so cheap as those on stilts." None are so cheap to those who build them, certainly, but when account is taken of the amount of property they destroy, and the injury they work to health and comfort, it may turn out, and we are inclined to think it will, that none are on the whole so dear. Here is the secret of the trouble, and the warning to other cities. The roads on stilts were adopted because they could be cheaply constructed, and the travel on them is therefore cheap to those who enjoy it at other people's expense. It is true that the few must sometimes suffer for the good of the many, and Americans are a little prone to the doctrine that a minority has no rights that a majority is bound to respect. Neither the public nor the courts are apt to make much account of the destruction of personal comfort; but to insist that the few must suffer in pocket for the many without compensation, when compensation can be made, is to carry things with a higher hand than we should expect to see allowed. Whether the roads are a mistake or not, it is not likely that the people of New York will consent now to give them up, and therefore it remains to fairly adjust the burden of expense. If the benefits are broad enough to include the whole city, the city may be fairly called upon to compensate the losers, and it may be found that this is the only remedy; but if the benefit is to one class of citizens, it is reasonable that this class should pay the scot. They will be called upon to pay it in the form of fares whenever authority shall compel the roads to compensate the damage they have done, — a thing which the courts will doubtless have abundant opportunity to do.

THERE is still another side to the question of the cost of elevated railways which New York especially illustrates, and which other cities will do well to consider. It is clear that the railways, as they now appear, are the ruin of the streets in which they run. If these are important streets, the loss is by no means limited to the persons whose property is upon them. To divert such streets from their natural uses is to diminish the actual capacity of the city. In a city as narrow as New York the sacrifice of two great longitudinal thoroughfares is a very serious one, not only to those who dwell or own or occupy upon them, but to the whole population, which is restricted in the space available for its business. The use of such thoroughfares as conduits for wayfarers is naturally but a small part of their function, though it may be the key to their other uses. The effect of giving them over to this purpose in such a city is to aggravate the very evils which quick transit is intended to cure, by still further narrowing the area of business and residence, and forcing it out into still more unmanageable length. And of this every inhabitant of the city shares the inconvenience. If this cannot be countervailed, it must be added to the other factors in the cost of the roads. It may be that, when all is accounted for, the value of the communication will justify the whole expenditure, but till this is done it is not safe to decide in their favor. Still less is it safe to assume that they are the necessary resort. The people of London, jealous of the comfort of their city, put their railway under ground; the people of New York, bent on immediate saving, carried theirs through the air. On the whole, the people of London seem to have been more suc-

cessful than those of New York. The London system is much more expensive to construct; the New York system bids fair to be in the long run the costliest method of communication that has ever been devised. The one creates property; the other destroys it. The one limits its discomforts to its passengers, and to the time they are in transit; the other permanently ruins the peace of whole streets full of inhabitants. In New York, however, the choice must probably be accepted as irrevocable, at least for our generation, and since the people have not been forehanded enough to adapt the railways to the thoroughfares, the next thing is to devise ways of adapting the thoroughfares as well as may be to the railways. Other cities will count the cost on all hands before they prefer the example of New York to that of London, or may be fortunate enough to discover some third system which will avoid the faults of both.

There is something peculiarly distasteful in the idea of a railroad up Vesuvius. It has come to that, however. A Neapolitan banker has got from his city government the right to run such a road up the mountain, and promises to have it ready for tourists in a few months. He will carry a double track on columns, or trestle-work, the up and down trains being connected by a wire rope passing over a drum, and worked by stationary engines. The trains will be light, consisting of four carriages, with four seats in each, the ascending one, of course, being balanced against the descending one. The sympathetic traveller has become used to railroads up Mount Washington and the Righi, and has consoled himself with the thought that at least by their means these places have become accessible to many appreciative persons to whom a three or four hours' ride or drive was an insurmountable impediment. But the half mile of track up which it is proposed to trundle the Vesuvian tourist will hardly be a real help to any but a few invalids, of whom it is no cynicism to say that they are better off below, and a crowd of lazy visitors, whose numbers the intelligent admirer of the mountain would take a justifiable pleasure in reducing. We may therefore be forgiven the pious hope that the enterprise will prove no more profitable to its projector than it is necessary. It is idle to protest against the tendency to make money by turning all the wonders of nature into race-shows; yet one might expect the government of a great city to have respect for its most famous treasure. The truth is, there is a real loss in the value to the world of those natural features whose glory is their remoteness and grandeur, when they are made too accessible. The impressiveness of Vesuvius is in the naked and unconquered desolation which even guides and tourists alone cannot obscure. The traveller who breasts the slope on foot, or climbs it slowly on horseback, is forced to feel its grandeur, but they who are dragged up by bucketfuls, along the trestle-work which will soon disfigure the lines of its unequalled slope, to find the edge of its crater marred by a railway station, and its awful eruptions mocked by the puffing of a steam engine, will have lost the grandeur of an impression which perhaps no other experience of their lives can parallel.

Employers of skilled labor who take pains and find means — though it be simply for their own gain — to interest workmen in their work and encourage them to study increase of skill in it, are doing the best possible service to the working classes, and using almost the only influence that is now at hand to counteract the foolish doctrines and dangerous discontent that are conspicuous among them. One encouraging example of this, which we should like to see imitated oftener than we do, is that of a noted firm of jewellers in New York, who have this summer offered a number of prizes among the workmen whom they employ in making silver ware. Prizes were given for both design and workmanship; the workmanship including chasing, engraving, and *repoussé* work. Against the efforts of trades unions to reduce all workmen to a level of wages and performance, and to absorb all their attention in political or social effort, some influence of this kind is necessary to advance their skill or even to keep it from deterioration, to say nothing of keeping up any interest in their work. If manufacturers would combine for this purpose, they might at once improve their own productions and do much to offset the tendency to hostile feeling and divergence of aims between themselves and their employees. A step in the same direction has just been taken by the British Government, which, imitating the action of the French at our Centennial, has sent a select body of skilled workmen to examine and report on the work shown at the French Exhibition of this year. Each workman is given a free pass to the Exhibition and a sum of money, with the privilege of fares and lodging at a reduced rate, and is expected to spend one or two weeks in examining his own department of the Exhibition.

The New York Society of Decorative Art, encouraged by the success of its previous loan exhibition, is preparing another to be opened this fall. The managers have hit upon the useful plan of supplementing the exhibition by a course of lectures on kindred subjects. Professor W. E. Griffis is to lecture on Japanese Art; General di Cesnola, on Ancient Art; Mr. W. C. Prime, on Pottery; Mr. John L. Hayes, on Tapestry; Mr. C. C. Perkins, on American Art in the Future; Mr. Charles Dudley Warner, on Egyptian Art. The lectures will be relied on to second the profits of the exhibition; while they will serve the more permanent use of at once illustrating the articles exhibited, and stimulating the common interest in arts they illustrate. They are arranged in some sort on parallel lines with the subjects of the exhibition; but the wish suggests itself, which always arises when we read the programmes of popular lecture courses, and especially where matters of art are touched upon, that the subjects could be systematically and consecutively arranged. The successive development of styles and the mutual relations of different departments of design are matters in which amateurs of art are commonly very little instructed, while they are very important in its study. Either of them furnishes a connecting thread by which unity may be given to courses of instruction which are too often disconnected, and therefore comparatively fruitless. The necessities of a course which, illustrating a temporary exhibition, must necessarily be in a sort extemporé, do not give much opportunity for systematic treatment; but the subject deserves the attention of whoever is concerned with instruction in art in this country.

The Women's School of Carving and Modelling, in Boston, is reopened this month, with some advantages over last year, having been taken into the family of the Museum of Fine Arts. It was started a year ago with considerable enthusiasm, and, in spite of the narrowness of the funds which could be collected for its support, had in many respects an encouraging success. There were, says its report, fifteen pupils, to whom instruction was given in modelling in clay, casting and carving in plaster, and carving in wood. It was not possible or desirable in one year's course to carry the instruction very far, but the pupils were advanced from exercises in the use of tools and the cutting of purely geometric forms, through incised ornament, up to modelling and carving simple ornamental designs in relief. Samples of the work of the school are exhibited in the Mechanics' Fair now open in Boston, and show the commendable advance of the pupils in using their tools and processes. It would be out of place to criticise them as actual products, they being placed there, as the report says, "not with the idea of indicating results, but only to show the methods pursued, and the kind of instruction attempted." This is a right idea, which we trust will always prevail; for nothing works such ruin to a school of art as to be invaded by the idea of production or of mercantile success, and to this invasion a school of decorative art is in these days peculiarly exposed. The association with the Museum may be expected to give a valuable stimulus to the school, both by access to its collections and by the working fellowship which it can supply. It is to be hoped that it may find friends who will see that it is not hampered by want of funds; for an experiment of this kind, if it is tried, ought to have the advantage of thorough appliances for its work.

THE EQUILIBRATION OF ARCHES.

A METHOD OF DETERMINING THE LINE OF PRESSURE IN A LOADED SEGMENTAL, SEMI-CIRCULAR, OR SEMI-ELLIPTICAL ARCH.

The conditions of stability in an arch are these:—

I. The curve of pressure, in that portion of the arch which is above the joint of rupture, must not pass outside of the middle third of the arch-ring.

II. The line of pressure at any joint must not make an angle of more than 30° with a normal to the joint.

III. The mean pressure on any joint must not exceed one twentieth of the ultimate resistance of the material to crushing.

Fig. I. Draw one half of the arch and load to as large a scale as practicable, not less than one half inch to a foot.

Find the angle of rupture, V, by the following table:—

Let R = radius of extrados.
Let r = radius of intrados.

I. For segmental arches, when r is not less than six tenths of the span, the springing joint is the joint of rupture.

II. For semi-circular arches with horizontal load line: —

When $\frac{R}{r} = 1.1$ V = 62½°.

When $\frac{R}{r} = 1.12$ to 1.17 V = 60°.

When $\frac{R}{r} = 1.18$ to 1.3 V = 57½°.

III. For semi-circular arches with load line sloping from an apex above the crown: —

I = the angle between the slope and a vertical.

	I = 60°.	I = 55°.	I = 50°.	I = 45°.
$\frac{R}{r}$	V	V	V	V
1.1	30°	30°	30°	30°
1.15	37½	35	35	32½
1.2	40	40	37½	37½
1.25	42½	42½	42½	40
1.3	47½	45	45	42½

The above table is from Woodbury's "Treatise on the Arch." It may be used for semi-elliptical arches, though probably not quite correctly. The precise determination of the joint of rupture is not important.

The portion of the arch which is below the joint of rupture is to be regarded only as a part of the pier.

Divide that portion of the arch-ring which is above the joint of rupture into three rings of equal depth. Draw ag vertical, and divide the load line ag into any number of equal parts, ab, bc, etc. Draw bi', cj', etc., vertical. (The occurrence of m' in the diagram at the intersection of the intrados with the joint of rupture is accidental.) If the density of the load differs from that of the arch, as it usually does, unless both are of brick, reduce ah to a'h, so that ah : a'h = weight of a cubic foot of arch : weight of a cubic foot of load. The arch, if of stone, may be taken at 170 pounds to the foot; the load, if of stone, at 150; brick-work at 110. In like manner reduce bi to b'i, cj to c'j, and so on. Find the centre of gravity of the quadrilateral a' b' i' h' (or a b i' h' as the case may be), considering h' i' as a straight line, by the following method: —

To find the c. g. of a triangle, from each of two angles draw a line to the middle point of the side opposite; the intersection of the two lines will give the c. g. To find the c. g. of any quadrilateral, draw diagonals, and from the end of each farthest from their intersection lay off, toward the intersection, its shorter segment; the two points thus found, with the point of intersection, will form a triangle, whose c. g. is that of the quadrilateral. See Fig. 2.

Mark the c. g. thus found C_1, and in like manner find C_2, C_3, C_4 C_5, C_6.

Find the area of each of the quadrilaterals. Assume I, at the upper edge of the middle third of the arch, as the point of application of the horizontal thrust at the crown. (In thin arches and in pointed arches it will be at the lower edge of the middle third.) From I lay off on a vertical, by any convenient scale, Io, to represent the first area a' b' h' i, op the second, pq the third, and so on. Determine the vertical C D, in which lies the centre of gravity of the whole area a' g' n m' b', thus: From I draw I O, and from t tO, at right angles, and connect Oo, Op, etc. From C_1, C^2, etc., drop verticals. Draw uv parallel to Oo, vw to Op, wx to Oq, xy to Or, yz to Os, and zC to Ot. Protract Io to C. The required c. g. will be in the vertical drawn through C. The edge of rotation will be at R, the lower edge of the middle third. Draw R Y horizontal. Multiply the sum of the areas of all the quadrilaterals by C R, divide the product by I Y, and lay off the quotients by the scale of Io, etc., from I to E on a horizontal. Connect Eo, Ep, etc. Protract E 1 to meet the vertical dropped from C, at 1. Draw 1–2 parallel to Eo, 2–3 to Ep, 3–4 to Eq, 4–5 to Er, 5–6 to Es, 6–7 to Et. Protract 1 1 to D. If the work is correct D R will be parallel to Et, and 6–7 will be a continuation of D R. The points I, 1, 2, 3, 4, 5, and R are points in the curve of pressure. If 1, 2, 3, 4, and 5 are all within the middle third the arch is safe, provided the other conditions of stability are observed. If the curve runs *below* the middle third, the arch is too heavily loaded over the crown, or too lightly on the haunches; if *above*, these conditions are reversed.

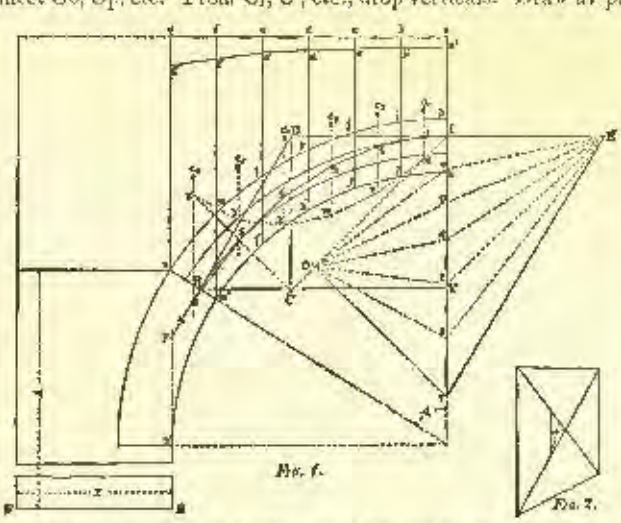


Fig. 1.

Fig. 2.

The line D R gives the *direction* of the pressure transmitted from the arch to the pier; and Et gives the *value* of the pressure, by scale of loads, in terms of area, which, multiplied by the number of pounds in a cubic foot of the arch, will give the pressure in pounds.

To determine the necessary width of the pier which carries the arch, proceed as follows: —

Protract D R to P. Decompose the pressure exerted at R, and now considered as acting at P, into its vertical and horizontal components, by the parallelogram of forces.

Let H = the horizontal component.

Let V = the vertical component.

Let h = the height of the pier assumed.

Let a = P B.

Let w = the weight in pounds of a cubic foot of the pier.

Let x = the required width of pier for bare equilibrium.

The moment of H is balanced by the moment of V plus the moment of the pier; that is, F being the edge of rotation of the pier

$$Ha = Vx + whx\frac{x}{2}, \text{ or } Ha = Vx + \frac{whx^2}{2},$$

whence

$$x = \sqrt{\frac{2a}{hw} + \left(\frac{V}{hw}\right)^2} - \frac{V}{hw} = \frac{\sqrt{2Hwh + V^2} - V}{hw}.$$

For stability take $\frac{2}{3}x$, or, if the pier runs up as usual to the load line, $\frac{1}{2}x$.

No account is here taken of the triangle a m' n', nor of the fact that the specific gravity of that part of the arch which is included in the pier may be greater than that of the pier itself; but these are unimportant, and only add slightly to stability.

CORRESPONDENCE.

LONDON, September 19, 1878.

For those who are looking about for modern architecture in and near London, no building is of greater interest than the Natural History Museum at South Kensington, which is now nearing completion. It is by Mr. Waterhouse, and is a fine example of the use of the round arch in the Norman style. The design is imposing, and in simplicity of disposition, and in subordination of detail to masses, it is markedly superior to any of the new public buildings I have seen here. No preoccupation for picturesque effect has broken the grand lines which rule from end to end of the immense pile, while a massive central structure and lofty corner pavilions finely accentuate the whole. The eye, at a glance embraces the design, and understands the disposition of the plan. The two lofty stories, with their large bays, indicate exhibition galleries, while the high basement and attic are for lecture-rooms, laboratories, etc. Between the attic windows are statues of animals, and gargoyles of animals seem more appropriate than usual.

The entrance is in the central pavilion,— not yet completed though high above the side galleries, — under a wide round arched portal, deeply recessed with columns, like the finest of the Norman porches. Passing through a shallow vestibule, from which open the exhibition wings on either hand, one stands on the threshold of a noble hall, at whose further end is a monumental staircase, dividing half-way to reach side galleries which lead to the second floor. The bays which separate these galleries from the hall are subdivided with delicate double arches, which look all the lighter because of the massive ones supporting them below. The latter form a series of barrel vaults, like the side chapels in some Romanesque churches, and are to be furnished with specimen cases. The great hall is, in fact, called Index Hall, from its containing index specimens.

The staircase from the galleries below to the floor above is carried in a most graceful and original manner on a vast arch, which, one bay from the entrance wall of the hall, rises in a wide sweep, unbroken by impost; the stairs from either side, uniting, spring from the centre of this vault to the floor beyond. The roof, though pierced largely with skylights, looks too heavy for the light, open iron-work trusses which support it, principally because the heavy window sashes are painted to count with the beams instead of with the ground glass. On whitish panels in the roof are painted specimens of tree branches; while the large end window has a pattern of red leaves upon it, — an appropriate use of stained glass. Behind the great hall is another for the natural history of Great Britain alone, and beyond that from a long vestibule open a series of large and small galleries. Two heavy square towers rise from near the rear galleries, without adding much to the beauty or utility of the design, though one is, I believe, to be used as a smoke shaft.

So much for the design and disposition of the building; apart from which it has still a great interest. It appears as if built of a yellowish sandstone, but near examination shows it is entirely of terra-cotta, backed with brick. Therein lies a strong claim to our attention, for it is the most successful application of terra-cotta in England, where

that material has thus far received its greatest development. The slabs vary from one to one half inch in thickness, and are moulded with flanges to be built into the brick-work. The length of them does not exceed eighteen inches, and generally is not more than a foot. A great secret lies in these short lengths, for with them the lines and mouldings can be kept perfectly true. The only place where there is any wavering in the mouldings is outside on the basement, — and that is very slight. Here the slabs were two feet long, so the warning was heeded, and no others were afterwards used of that length. This defect in terra-cotta Mr. Waterhouse has kept clearly in view, designing his mouldings and decorations for the most part in divisions or panels, so that any slight irregularity does not show. The Norman billet and zig-zag mouldings lend themselves easily to this; but more varied means are turned to account, such as the articulations of bamboo; and even those of the spine are formed into an effective moulding; which latter would seem far-fetched in a building devoted to another purpose. A concave moulding around the great staircase-arch is filled with them, and at intervals from this vast spine sprouts a monkey! I expected to see a man triumphantly astride of the keystone, but the designer refused such homage to Mr. Darwin, evidently, for the series of monkeys comes grinning down to the ground again, — which is keenly suggestive. There is true Gothic flavor in this; for if we but knew local mediæval traditions, how full of meaning would be the now senseless grotesques which crop out everywhere in Gothic cathedrals. The stone age precedes that of wood, and the predecessors of Punch's wood-cuts were these quaint satires in lithograph.

Another curious conceit is carried out in the main exhibition galleries. The ceiling of these is supported upon two series of square piers, which two thirds up are decorated with pilasters; just under these, there is a carved Grecian fret. If you notice some wavy lines below, it will flash across you that the fret represents the sea line, and probably not till then will you notice that every three or four of the pier slabs have delicate reliefs of various fishes, and, nearer the bottom, of shells: while on the base itself is carved a band of sea-weed. Jules Verne might well be in despair at this walk under the sea, did these reliefs — barely raised from the surface — not look uncommonly like fossil prints, which destroys the sensational effect. Throughout, great art is shown in finding decoration drawn from natural history; and it is to some purpose that the difficulties of terra-cotta have been overcome, for it has permitted an amount of this decoration in panels and diapers which would have been of fabulous cost if done in stone.

On the whole the building seems peculiarly successful, and shows a marked advance since Mr. Waterhouse designed his Manchester Assize Courts, where, though the plan and masses are fine, the same cannot be said of the details. As a practical hint, some difficulty being at first found in cleaning the terra-cotta after it was in place, it was discovered that a little muriatic acid, followed up with water, removed all stains. Gibson and Canning were the contractors for the terra-cotta. The whole cost of the building will be some £400,000, it is thought. Mr. Waterhouse has just finished two large business buildings in red brick with red terra-cotta trimmings. They are both fine, but the last is in the same round arched style as the Museum, and owing to the success of these two buildings, he told me he should probably design for the future in that style, rather than in that of the pointed arch, in which he did his earlier works. In one of the above buildings there is an ingenious ceiling, which is formed entirely of white tiles with colored pattern. The beams are cased in them, and the intervals between filled with square pieces; where the corners of four pieces come together, a joist from the floor above holds them up with a flat cap, and over this is secured a tile rosette, so the ceiling presents as clear a surface as if the tiles had all been bedded in cement. As the walls are of light, enamelled brick, the effect is bright and fresh.

The other great building upon which they are at work here is the New Law Courts, by Mr. Street. These are being slowly pushed through the mass of houses crowding Holborn, and now terminate at Temple Bar. As if to commemorate this triumph — as memorable as unworthy — over the demolition of the most historic of London monuments, a massive tower rises just by its mutilated piles. No more foreboding monument could have been raised to haunt the guilty iconoclasts than this grim tower, which frowns down on the busy street. It is as heavy and windowless as a donjon, and I believe actually is to be used as a reservoir. However, if you do not like that tower you can choose another tower, for though the building is not yet half up, there are three already in the completed part. It is unfair to criticise finally an unfinished work, but the design seems to be so terribly broken up in a frantic struggle after the picturesque, that I fear the last trace of unity will disappear with the scaffolding — for that binds together in some measure the parts. Throughout there seems a wanton elimination of axes. Windows and divisions are hopelessly uneven, and by no chance is there correspondence or repetition of parts. The front, upon Holborn, is of a gray stone, which heightens the dryness of the architecture, already cold in the side and rear façade, where the stone trimmings are warmed with brick. This dryness is increased by a great deal of diaper ornamentation, too deeply carved, which gives a cast-iron look. The building has disappointed the profession generally.

Far more successful, in quite a different style of Gothic, is the American Episcopal church, at Rome, which Mr. Street designed. "St. Paul's within the Walls," situated in the new Via Nazionale, was the first Protestant church built in Rome, for it was begun just after the entrance of Victor Emmanuel. Although it has been open for worship some time, it is not entirely finished, as it was wisely begun on a scale which would leave it in the future open to memorial gifts and bequests. It was intended to be, and is, a fitting monument — the only one we have in Europe — of American religious zeal and liberality. In spite of their "Church and State" which the English proverbially carry everywhere with them, their churches in Rome are insignificant chapels beside our basilica, which with apse and side aisles measures 138 feet by 62 feet in width, and is 50 feet to the top of the open timber roof. It is in the early Gothic style of Northern Italy, built with travertine bands, — a style in which all who have read Mr. Street's work on the Gothic of Northern Italy will acknowledge him a master. From the apse itself, 20 feet deep, a choir projects 22 feet into the nave, and at its corners are two beautiful ambones with colored marble colonnettes, in the style of those of the twelfth century. The fine marbles, so common in Rome, are turned to the best account, and the effect will be extremely rich when the conque of the apse is filled with the projected blazonry of mosaics. Some capitals and other carving are unfinished, awaiting funds. The stained glass shows the best work of Clayton and Bell. A full peal of chimes has been given and is about to be hung in the tower, which, in spite of Rome's three hundred and sixty-five churches, adds a conspicuous and beautiful feature to the city. Its design was suggested by the graceful ninth century campanile of Sta. Pudenziana, and it rises directly from one side of the nave gable towards the street. Although it is to be regretted that so successful an American monument should not have been designed by a countryman, all who are familiar with its history know that no small share of its success is due to the intelligent energy of its rector, the Rev. R. J. Nevin, D. D., who, as Mr. Street could pay but three or four flying visits to Rome during its erection, ably presided over everything which was done; and though a Swiss archbishop regulated the accounts of the contractor, and was clerk of the works, Dr. Nevin really had the chief responsibility, and decided many of the difficult questions.

R.

THE CHICAGO ACADEMY OF DESIGN — LECTURES ON ARCHITECTURE — THE EXPOSITION.

Chicago, October.

The Chicago Academy of Design, an organization ten years old or so, which has passed through many trying periods and numerous reorganizations, has recently added a course in architecture to the art studies pursued in its schools. This is one of the results of the last reorganization, which took place during the spring of the present year, infusing a new life into its torpid and neglected body. The academy, unlike that of New York, is a mixed body of artists and amateurs. It has been found that the artists here are as yet too weak to maintain an organization of their own. It differs also from that referred to, in that it is unable to afford free instruction in art. But, with small fees for tuition, its classes in all departments are well filled, and the students are enthusiastic.

For the present nothing further than a course of lectures in the architectural department will be attempted. The lecturer for this season is Mr. W. L. B. Jenney, practising architect, of this city. The lectures will be free to students in the other departments, and will be open to the public for the moderate fee of one dollar for the course of five lectures, and twenty-five cents for single admissions. The first lecture will be delivered on October 3 at the rooms of the academy, corner of State and Monroe Streets.

The announcement says that "the subject of the lectures will be the history of the different styles of architecture that have arisen, flourished, and passed away, from the earliest period of which we have any knowledge, — the savage tribes, Egypt, Assyria, Greece, Rome, and the Middle Ages." A knowledge of the architecture of a country at any epoch is a knowledge of the people, of the religion, and of the government of that country at that epoch, and is of interest to the traveller, to the student of history, and to all persons of liberal education, as well as to those practising architecture as a profession. It is to these classes that these lectures are directed, and the lecturer promises to avoid technicalities and the dry details of construction, and will illustrate, as far as possible, with off-hand crayon sketches.

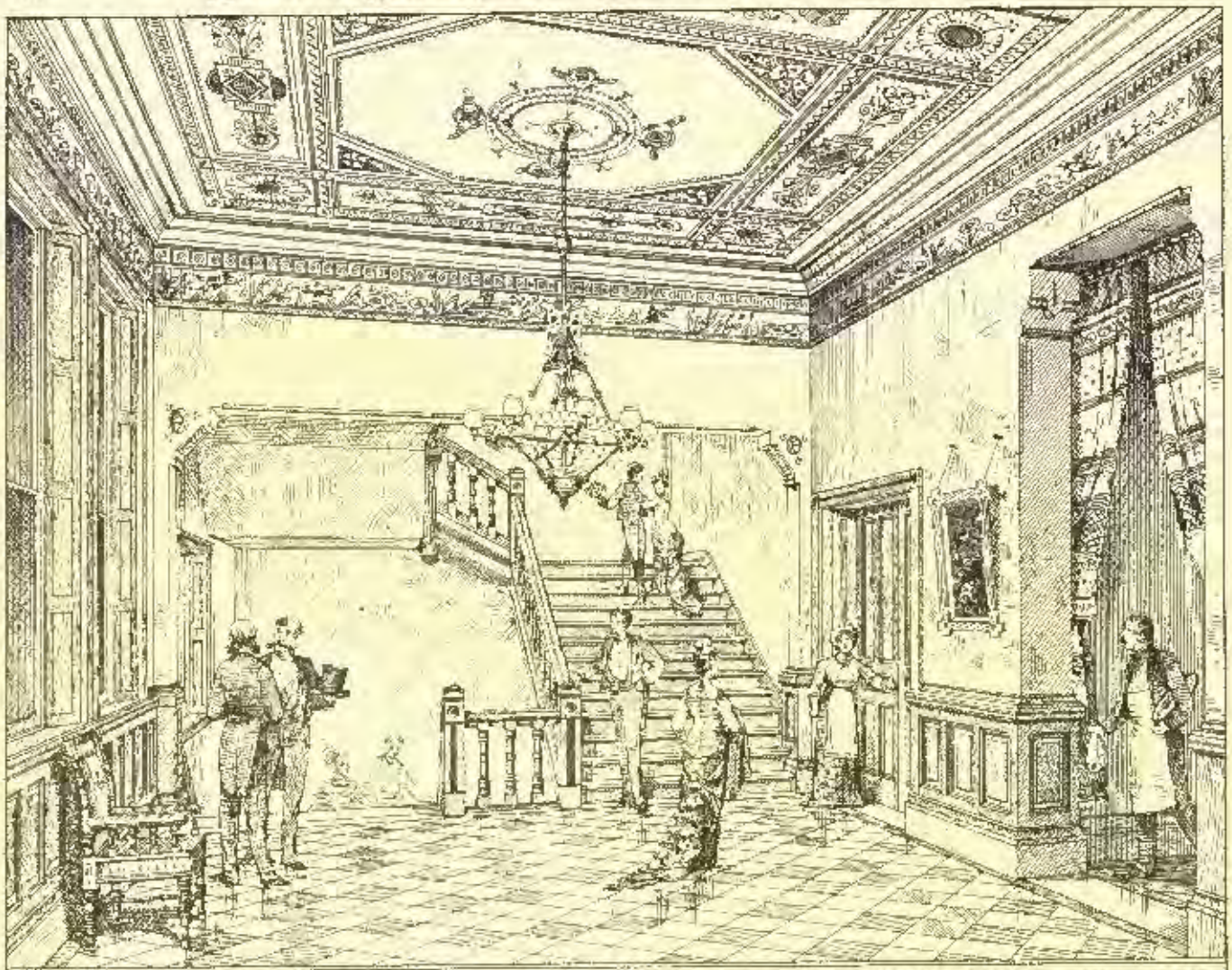
The following is a list of the subjects to be treated: —

I. October 3. The Savage Tribes and Egypt.
II. October 10. Assyria and Judea.
III. October 17. Greece and Rome.
IV. October 24. Mediæval Period — France.
V. October 31. Mediæval Period — England.

Each annual subscriber and life-member of the academy will receive two tickets to the course.

It is also announced that upon the conclusion of these lectures, Thursday, November 7, an additional evening will be given to the architecture of Paris, to be illustrated by stereopticon views. Following Mr. Jenney's course other lectures on the fine arts are promised.

The annual Inter-State Exposition is now open in this city. The fine art exhibition is always an attractive feature of these annual displays of industry and art. The art galleries are in a separate



RECEPTION HALL & STAIRCASE * ALLEMANIA CLUB HOUSE * CINCINNATI * J.W.McLaughlin, Arch't.

STREET FRONT.

HOUSE AT CHATEAU-LANDON-FRANCE. — E. LETANG-ARCHT BOSTON.

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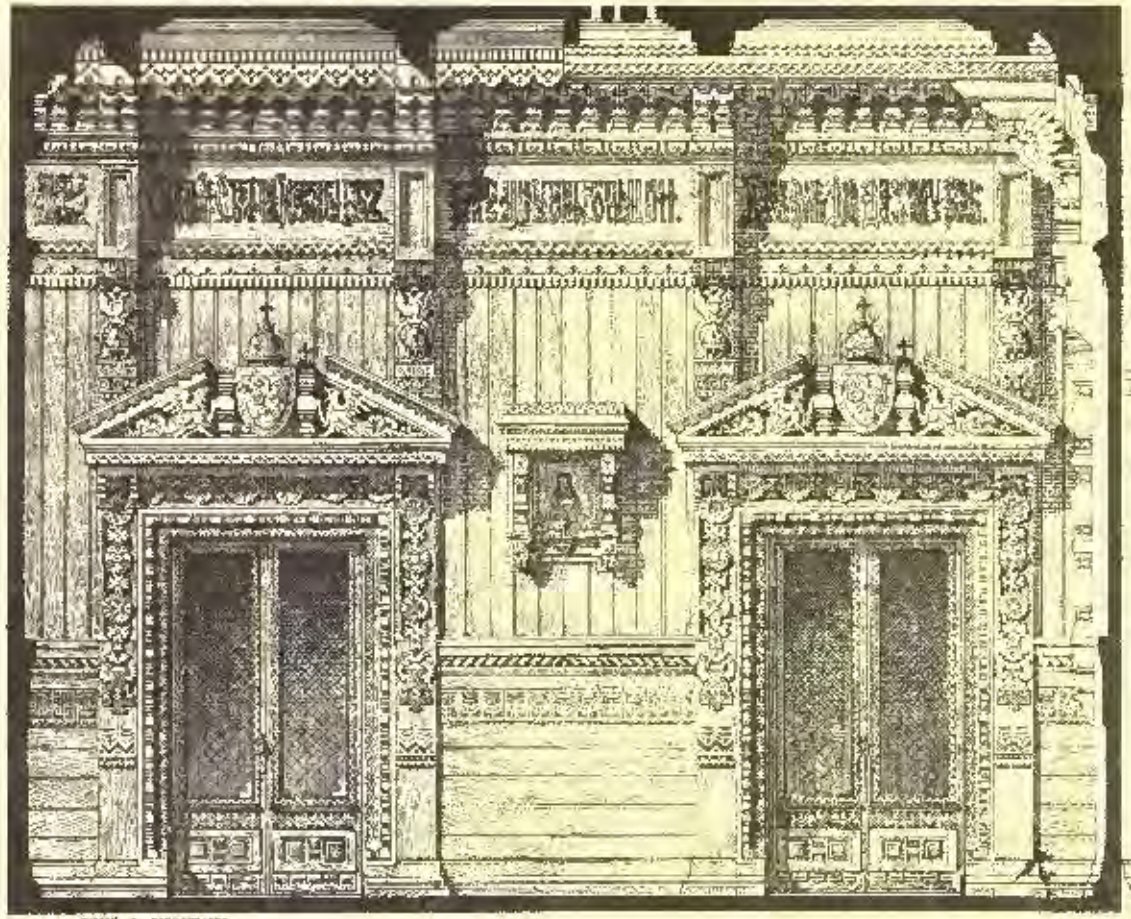
ДВОРЕЦЪ ЕГО ИМПЕРАТОРСКАГО ВЫСОЧЕСТВА ГОСУДАРЯ ВЕЛИКАГО КНЯЗЯ ВЛАДИМІРА АЛЕКСАНДРОВИЧА.

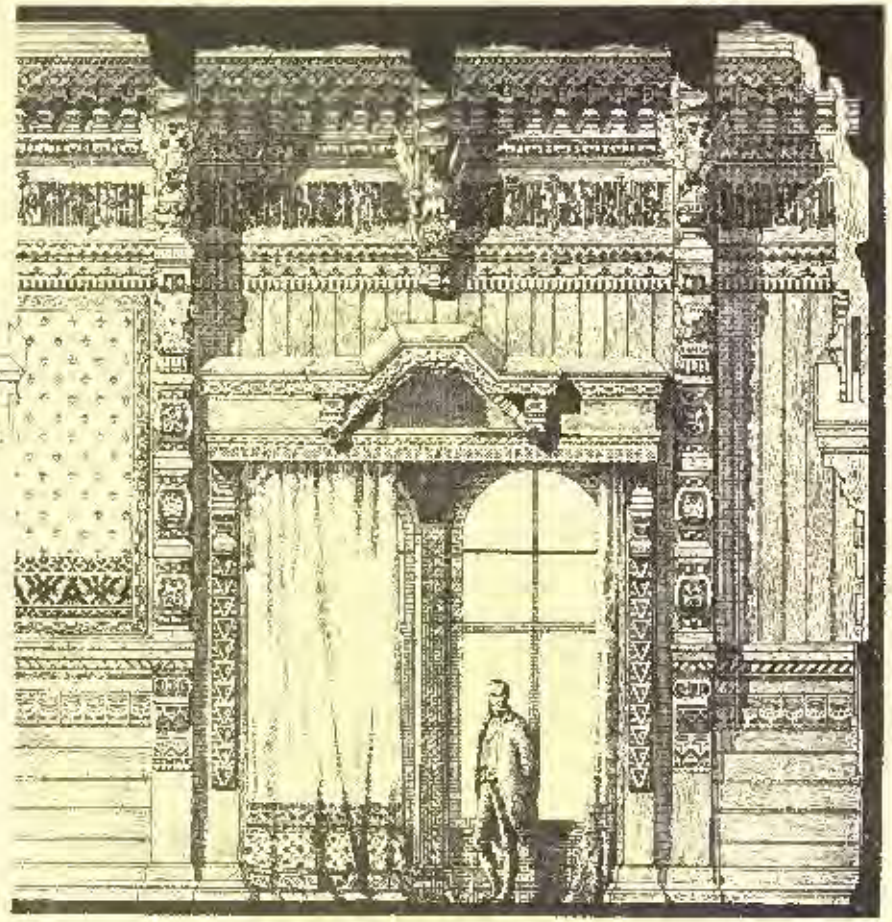
PALAIS DE SON ALTESSE IMPÉRIALE LE GRAND DUC WLADIMIR ALEXANDROWITCH

БОЛЬШАЯ СТОЛОВАЯ. GRAND SALLE A MANGER.

ПОПЕРЕЧНЫЙ РАЗРѢЗЪ. COUPE TRANSVERSALE.

ЧАСТЬ ПРОДОЛЬНАГО РАЗРѢЗА. PARTIE DE LA COUPE LONGITUDINALE.





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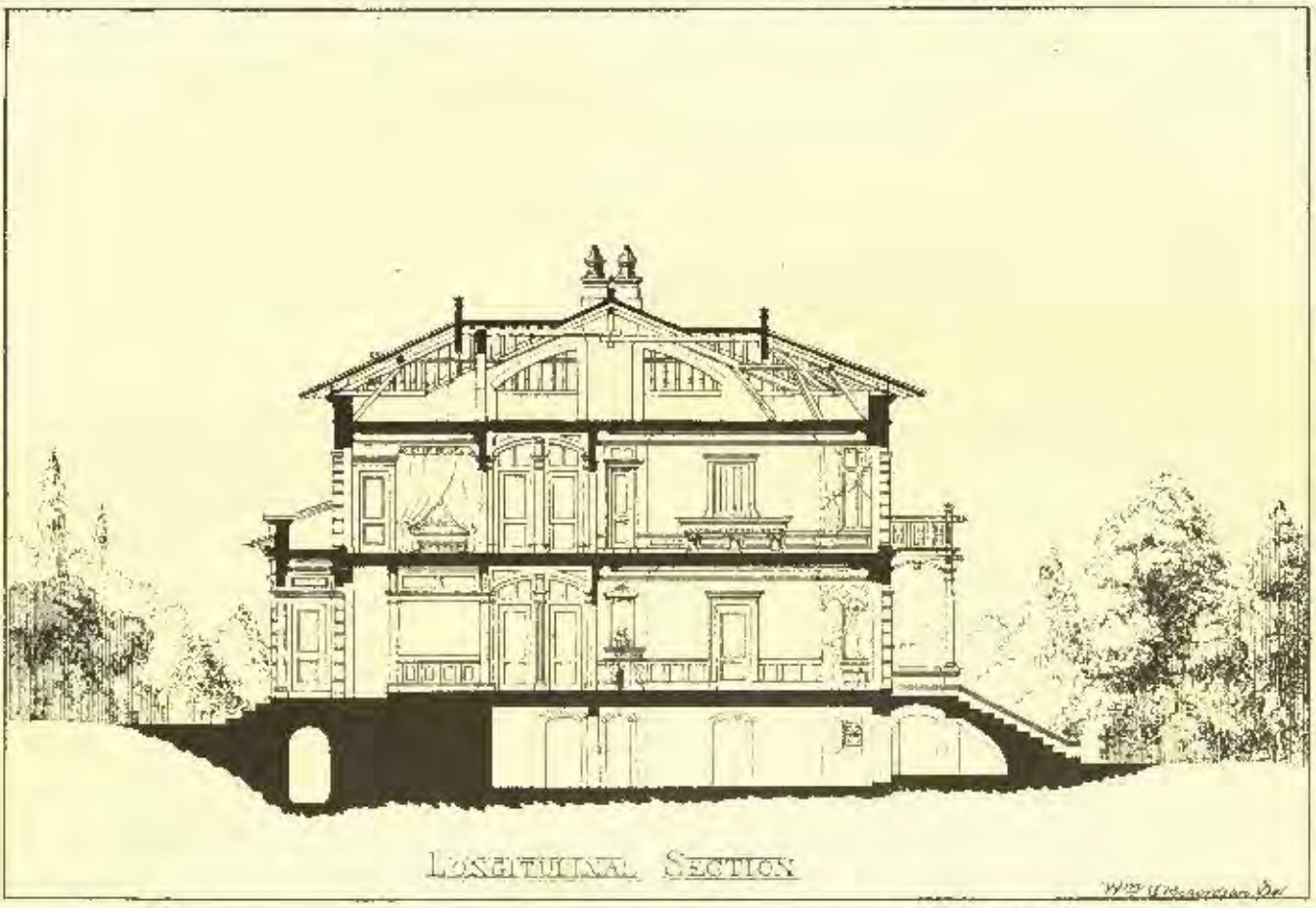
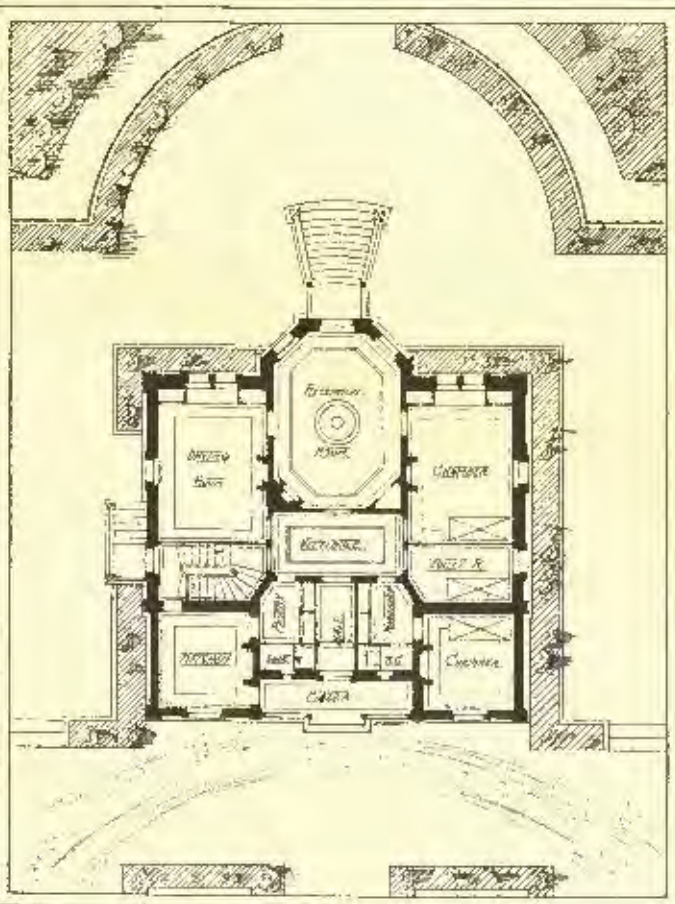
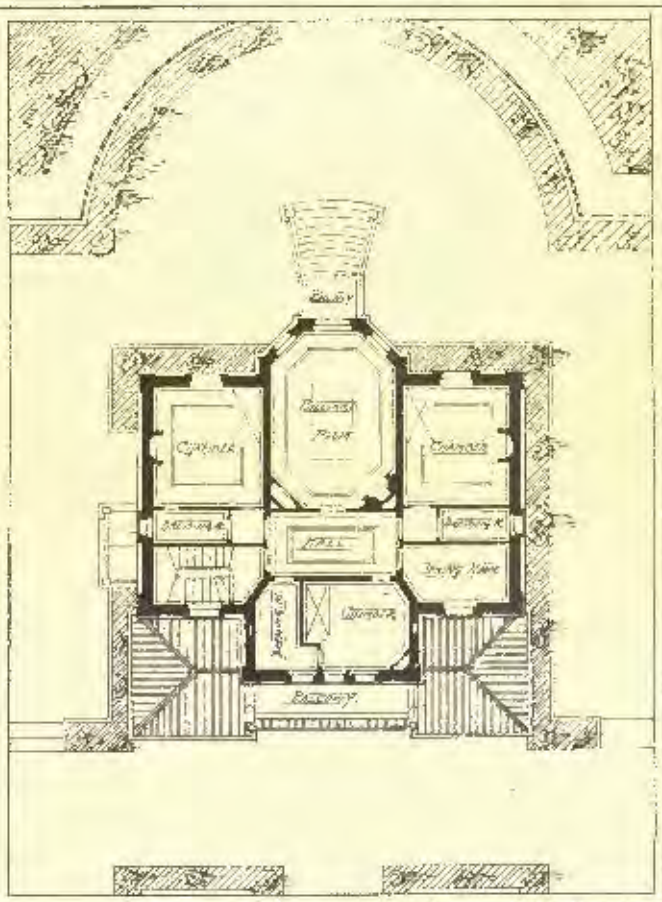


LONGITUDINAL SECTION

HOUSE-AT-CHATEAU-LANDON-FRANCE E. LETANG-ARCHT. BOSTON



PLAN FIRST FLOOR



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THE HELIOTYPE PRINTING CO. 220 DEVONSHIRE ST. BOSTON

building, which might be called an "annex," to follow the present fashion in nomenclature. There are six rooms, which together equal in capacity the galleries of the Academy of Design in New York. One room contains paintings by local artists, and water-colors mostly sent by Eastern artists. The second room contains a loan collection of paintings, and is probably the best exhibit ever made in this city. The best contemporaneous French artists and a few of the best Americans are represented. It can safely be said that there is not a bad picture in the room. Most prominent is Cabanel's "Phædra and Œnone," loaned by L. Z. Leiter, of this city. This is the first Cabanel, other than a few portraits, that has been exhibited in Chicago. The Exposition Company has recently purchased a very full collection of casts of well-known pieces of ancient sculpture, including some Assyrian bas-reliefs. It also has some examples of Renaissance carving. These fill two rooms. The Parthenon sculptures are admirably placed. Representative pediments have been constructed to show the position occupied by the originals, and the frieze bas-reliefs may be seen consecutively and in good light. As a popular educator this collection is of inestimable value, as it is seen by an average of ten thousand people daily. In one room is an exhibition of artistic photography. The pictures are all treated as works of art, hung by the committee and catalogued. No photographers' signs or advertisements are allowed.

The exhibit of Chicago's art manufactures is not so good or extensive as in former years. The exhibits of artistic carpets, curtains, and tapestries by Field, Leiter & Co. are remarkable. These are mainly importations. Many duplicates of the finest contributions of the Glasgow looms to the Paris Exposition may be seen, and among them is a set of the Whistler curtains of peacock pattern.

The Minton tile exhibition of Charles L. Page is an attractive and artistic contribution, and in modern art pottery Burley and Tyrrell show some of the finest pieces that have been produced.

The interest of the masses of the people in matters of art is evinced by the fact that most of the visitors to the exhibition go directly to the art rooms on entering. The rooms are crowded from morning to night, so that at times it is impossible to gain admission to them.

THE ILLUSTRATIONS.

CHURCH AT OYSTER BAY, L. I. MESSRS. POTTER & ROBERTSON, ARCHITECTS.

DINING HALL IN THE PALACE OF THE GRAND DUKE, WLADIMIR ALEXANDROWITCH.

This illustration, a very characteristic example of interior finishing in the Russian style, is copied from the Russian building journal, the *Zodchy*.

HOUSE AT CHATEAU-LANDON. MR. E. LETANG, ARCHITECT.

The villa was erected some four years ago at Château-Landon, near Paris, at a cost of about ten thousand dollars ($10,000). The garden front looks towards extensive vineyards, and beyond and about a hundred feet below upon a very pretty little stream. There are many trees upon the place, and a fine growth of shrubbery. The materials of construction are brick for angle quoins, a light brown stone for cornices and basement, with plaster filled in between. The floors are of iron construction, deadened by means of plaster filling. Partitions of brick, having arches spring from them to stiffen chimneys, help to support the roof.

RECEPTION HALL AND STAIRCASE IN THE ALLEMANIA CLUB HOUSE, CINCINNATI. MR. J. W. D'LAUGHLIN, ARCHITECT.

We printed last week a perspective exterior of this club house, with a short description.

THE RATING OF BUILDINGS.

AMONG the natural results of the present state of the business community is a large increase in the number of buildings that are subjected to a change of use. This is especially the case with buildings put up as manufactories, and for trade purposes. Dwelling-houses, as a class, seldom change their purpose, but with buildings put up for business uses the case is different. When the occupants of such a building change, the next use of that building will probably change also to whatever business it is supposed will pay, or happens to be seeking a domicile. The result is an unusually large number of cases where the building is not fitted for its present use. These things were illustrated with emphasis by an accident in New York, not long ago, whereby one man lost his life, and others were more or less injured. In this case the building was originally put up for and used as a machine shop, for light work, the making of sewing machines. It was of brick with iron columns, and the floors were brick arches on iron beams; the whole only about twenty years old, and, if kept to its normal use, apparently good for another score. But in its original use the weight was naturally heaviest on the lowest floors; there would be the heaviest machinery, and there the heaviest accumulations of stock. Even there the weight upon any one square yard of floor would seldom amount to one half of a ton, and never average that over eight or ten contiguous square yards; while in the upper stories a load of six hundred pounds would probably be the maximum upon any one square yard, and less than half that an average load. But the sewing machine company grew, and, leaving their building as the soldier crab does his shell, moved to more commodious quarters, and a cabinet maker occupied the building. Of course a building strong enough for a machine shop and iron work was expected to be strong enough for cabinet making and light wood work; but what was the fact?

The accident was a break in the sixth floor; this floor was constructed of brick arches upon iron beams; these beams were about five feet from centres, and rested upon girders sixteen feet from centre to centre; the girders rested upon the cap of columns twenty feet from centres, and were secured to the heads of the columns by bolts passing through lugs on each side of the web of the girder, through which the bolts also passed; there were three or four of these bolts about seven eighths of an inch in diameter at each end of the girder, and it is to be noted that when the girder fell the lugs upon the head of the columns and the bolts stood, tearing out the web of the girder like pie-crust. The girder which broke was of cast iron, with wrought tie; the cast iron was in form like a plain I-beam sixteen inches deep, six inches across the top flanges, three inches across the bottom flanges. At each end of the girder, and upon its lower flange, were lugs, forming sockets for the two-inch wrought iron tie-rod. The upper member of this girder had about ten square inches of cross section, this was under compression; the lower part of the cast iron had about seven square inches of cross section which was practically useless, as being about the neutral axis; while the real lower chord, the tie-rod, had about three square inches of section, which was under tension. Upon this girder rested the weight of three hundred and twenty square feet, or about thirty-five square yards, of the floor mentioned, with whatever load might be placed upon it, or hung under it.

This girder should have an ultimate supporting strength of about eighteen tons, and the tie-rod would be the weakest point. Out of this eighteen tons should be taken the weight of the floor, including the girder itself, in all about seven tons, leaving less than twelve tons as the carrying capacity of the floor; and this reduced by a factor of safety of two[1] would leave only six tons as a reasonable load on the thirty-five yards of floor, or about three hundred and fifty pounds per square yard, equal to forty pounds per square foot. This is supposing the tie-rod to be, as it would with material of uniform quality, the weakest point; and the fact that breakage actually occurred by the crushing and crumbling of the upper member, while the tie-rod was uninjured, only shows that the quality of the cast iron was below the average; in fact, a soft metal, as was remarked upon the spot, better fit for sewing-machines than for building purposes. But it is seen that in no case would this floor be safe for more than forty pounds per square foot. It was loaded with stock. How much cannot now be proven; but, judging from the rest of that floor, as well as the rest of the building, it is fair to say that it was a common thing to pile bureau backs or drawer bottoms in close-packed piles six feet high, which would weigh near one hundred and eighty pounds per foot; and black-walnut stock was piled on these upper floors in close packs six and seven feet high, by eight or more wide, by twelve to twenty feet long, equal to three hundred pounds per foot or twenty-seven hundred pounds per yard, showing that the furniture-maker needed in his upper floors three or four times the strength that the sewing-machine company required in their lower ones.

In the above case some of the floors, as, for instance, the one immediately below the falling girder, were of stronger build; besides, at that particular point this next floor was not so heavily overloaded, being occupied by the cabinet-makers' benches and men at work. Had the same break occurred at some points a few feet from there, it would probably have gone on to the cellar.

This is an example of the changes and risks often incurred in the uses of a building, even if supposed to be strong enough for a manufactory under the building law.

This matter of change seems to need some more competent supervision than the guess-work of the ordinary mechanic; something more nearly akin to the maritime rules, where a ship is inspected when built, and classed for a certain number of years in one grade, and then again inspected and rated for the next term in such grade as she seems fit for. And the class of cargo permitted in each grade is specified: thus, a ship built for carrying heavy blocks of marble from Italy, while she holds that rating, may take almost any freight, but after that will be rated for light and dry freights, and still later for only lumber and non-perishable matters; while one built for light freight and passenger service will not be insured at all, nor, in fact, allowed to carry marble blocks, nor even pig-iron in large quantity, without especial inspection. In these cases the matter is not left to the judgment of the captain; but the ship's rating is expressed upon her papers and in the published list, to be seen and read of all men. Something similar seems to be needed in regard to buildings. Suppose that a commission of competent architects were created, whose duty, like Lloyds' inspectors, should be to rate the building for a given term of years and for a given service, with regular inspection and rating at the end of the term, and who should be made aware of all changes in the building during the term, and have power to change the rating accordingly. Let the rating show the maximum load to be permitted on each floor, and the number of years it should be permitted; and then make the occupant who overloads his floor responsible for all damages, including a deodand for personal injury resulting therefrom, and the result would be well for all. It may be thought that this would be an infringement of the rights of the

[1] A dangerously small factor. — EDS. AMERICAN ARCHITECT.

owners; but public safety overrides private rights. Nor are ship-owners desirous to evade the Lloyds' rule. Until every man is competent to judge the strength of a building in all its parts, and until every man has sense enough to calculate the weight of his material and tools, some one who has this judgment and ability should be employed; and if the individual will not employ them, the public must.

It may be said that the ship carries the property of various parties who cannot be expected to examine and judge for themselves, and who, without the authorized rating, would be at the mercy of any captain either ignorant or unprincipled enough to take the advantage of them, and thus much property would be lost. But in regard to the manufactories, they are at this moment filled with men, women, and children who are at the mercy of ignorant and unprincipled employers; and the comparison lies fairly between the importance of saving property and of saving human life. VIVARTIAZ.

FRENCH PAINTING OF TO-DAY.

We translate from *L'Artiste* parts of a long notice of paintings at the Exhibition, which gives a lively sense of some of the French artists' present tendencies: —

Mme. Marie Collart has a third medal. This is honorable for those who have a second. I have no hesitation in declaring that men of feeling will take pleasure in looking at Mme. Collart's orchards when some of the medalled pictures of the Exhibition of 1878 are no longer valued except as curiosities. Very curious, in truth, is the machinery of Messrs. Mackart, Matejko, Padilla, Siemiradski. But all their art goes into their stage properties. No one personage in these huge canvases has ever found himself face to face with life, has ever loved or felt an impulse of emotion. I have nothing in common with this artificial humanity which does not speak my language and lives in a world which is not mine. It is written in an archæological jargon, diffuse and pedantic, which has no more possible relation to the truth of any epoch than the archaism of Alma Tadema. Thanks to this accommodating tendency, painting is sliding farther and farther down the declivity of dead things, substituting for the true and just representation of man, and the medium in which he lives, the findings of unwholesome exhumations, — costumes, furniture, and gimcracks. Hence a harlequin art, which includes only an active and adroit minority, well skilled in handling the wardrobe of the ancients, and whose great cleverness consists in only painting enigmas of which no one can get hold. Pure charlatanery.

But the great subject of art in all well-balanced periods is man. He fills the whole breadth of the stage with his aspirations and his pains. Yet I look in vain for this eternal manhood in the work of most contemporary artists. I find, it is true, a certain special manufacture, substantially abstract and conventional, which has an anatomical correspondence with a human being, and that only. Academical instruction has made it a sort of human currency, which is accepted as good money, and circulates freely at exhibitions. But this disjointed manikin is never got out of the realm of mechanism. He moves about automatically among factitious surroundings; he has but a small number of gestures and attitudes, which are adopted pretty indifferently for all situations.

Here is an actual occurrence: A worthy tradesman one day borrowed my catalogue of the *Salon*. He, too, wanted to get an idea of the condition of the arts. He went back and forth half a day in the *Salon*. He was interested chiefly in the great mechanisms. Historical painting attracted him prodigiously, and, naturally, before each great canvas he opened his book and read the title.

No. 928. This represented a personage in a pit, under a red and black effect of light. The man had a great beard, and lifted his eyes to heaven with an expression of ecstasy. The worthy man read in his book, *St. Lawrence the Martyr*. "Ah," said he, "it's before he was roasted." He stepped up to the picture and looked long at the face of the Saint, and said: "After all, it must have been afterwards, or else while it was doing."

He passed to No. 1056. On a bed in confusion was stretched out the half-nude body of a young woman. A certain stiffness characterized her limbs, and her eyes were fast closed. It suggested a person in catalepsy. A torch threw red gleams upon the bed and reddened the paleness of the flesh next it. The tradesman read, *The Death of Catherine de Medici*. He gave a start. "What!" said he, "did she die with so little clothes on as that? A queen, too!" And after a moment's reflection he added, "Perhaps they are going to lay her out." He stopped before No. 311, and saw a gray-haired man holding his head between his hands. He seemed buried in the reading of a folio which was spread upon the table. The man was shown in full face. His eyebrows were contracted, his expression intense and tragic. My friend read, *The Last Day of a Condemned Felon*. He was greatly moved. How real that was; he could imagine himself in the sufferer's place. Doubtless he was seeking a last consolation in the reading of the gospel.

A little farther he saw some priests standing up, their arms raised before an altar. One of them, who wore a mitre, was stretching out his hands toward a man and woman that lay prostrate, their faces in the dust. He opened his catalogue, not understanding, and read, *The Nuptial Benediction*.

"Exactly," he exclaimed; "they are great personages; the pope is marrying them; but what the devil do the priests and choir hold up their arms for? However, I suppose it's part of the ceremony." And he went away, convinced and content.

"Unluckily," said I to him when he brought me the book, "you made a mistake. This catalogue" —

"Well, what?"

"Is last year's," and I put into his hands the catalogue which he ought to have taken.

He shook his head. "It is impossible," said he. "The pictures correspond exactly to the titles in the catalogue."

He turned over the pages and fell upon No. 928. He read, *The Miner's Prayer*. He started. "What! this monk, this St. Lawrence, a miner?"

No. 1056, which he had taken for The Death of Catherine de Medici, had for its title *The Sleep of Innocence*. That which he had taken for The Last Day of a Condemned Felon was *A Philosopher studying a Problem*. Finally, The Nuptial Benediction was called in the catalogue *An Anathema*.

The good man was overwhelmed. I said to him, "You are experiencing the art of our day. The subject is no matter what. It is for the catalogue to tell you what you are to see and understand. You think you see a corpse. Not at all; it is a sleeping woman. A philosopher wears the head of a criminal; a pope cursing resembles a pope blessing, and so on. This comes from the fact that there is a limited number of conventional forms which are the general property of artists. They belong to everybody and serve all purposes. They are like the lasts of the village shoemaker."

AERIAL ECHOES.[1]

BY PROF. JOSEPH HENRY.

During the year 1877, and also in 1876, a series of experiments was made on the aerial echo, in which I was assisted in the first series by General Woodruff, engineer of the third lighthouse district, and in the second series by Edward Woodruff, assistant engineer of the same district. These experiments were made principally at Block Island, but also at Little Gull Island. Especial attention has been given to this phenomenon, which consists in a distinct echo from the verge of the horizon in the direction of the prolongation of the axis of the trumpet of the siren, because the study of it has been considered to offer the easiest access to the solution of the question as to the cause of all the abnormal phenomena of sound, and also because it is in itself an object of much scientific interest.

In my previous notice of this phenomenon, in the report of the Lighthouse Board for 1874, I suggested that it might be due to the reflection from the crests of the waves of the ocean; but as the phenomenon has been observed during all conditions of the surface of the water, this explanation is not tenable.

Another hypothesis has been suggested, that it is due to a discontinuity in the atmosphere, or to an acoustic invisible cloud, of a density in different parts differing from that of the general atmosphere at the time. To test this hypothesis experimentally the large trumpet of the siren was gradually elevated from its usual horizontal position to a vertical one. In conception, this experiment appears very simple, but, on account of the great weight of the trumpet, it required the labor of several men for two days to complete the arrangements necessary to the desired end. The trumpet, in its vertical position, was sounded at intervals for two days, but in no instance was an echo heard from the zenith, but one was in every case produced from the entire horizon. The echo appeared to be somewhat louder from the land portion of the circle of the horizon than from that of the water. On restoring the trumpet to its horizontal position, the echo gradually increased on the side of the water, until the horizontal position was reached, when the echo, as usual, appeared to proceed from an angle of about twenty degrees of the horizon, the middle of which was in the prolongation of the axis of the trumpet. A similar experiment was made with one of the trumpets of the two sirens at Little Gull Island. In this case the trumpet was sounded in a vertical position every day for a week with the same result. On one occasion it happened that a small cloud passed directly over the island on which the lighthouse is erected, and threw down on it a few drops of rain. At the moment of the passage of this cloud the trumpet was sounded, but no echo was produced.

From these experiments it is evident that the phenomenon is in some way connected with the horizon, and that during the continuance of the experiment of sounding the trumpets while directed toward the zenith, no acoustic cloud capable of producing reflection of sound existed in the atmosphere above them.

Another method of investigating this phenomenon occurred to me, which consisted in observing the effects produced on the ears of the observer by approaching the origin of the echo. For this purpose, during the sounding at the usual interval of twenty seconds of the large trumpet at Block Island, observations were made from a steamer, which proceeded from the station into the region of the echo, and in the line of the prolongation of the axis of the trumpet, with the following results: —

1. As the steamer advanced, and the distance from the trumpet was increased, the loudness of the echo diminished, contrary to the effect of an echo from a plane surface, since in the latter case the

[1] From the Report of the Lighthouse Board, 1877.

echo would have increased in loudness as the reflecting surface was approached, because the whole distance traveled by the sound-wave to and from the reflector would have been lessened. The effect, however, is in accordance with the supposition that the echo is a multiple sound, the several parts of which proceed from different points at different distances of the space in front of the trumpet, and that as the steamer advances toward the verge of the horizon, it leaves behind it a number of the points from which the louder ones proceed, and thus the effect upon the ear is diminished as the distance from the trumpet is increased.

2. The duration of the echo was manifestly increased, in one instance, from five seconds, as heard at the mouth of the trumpet, to twenty seconds.

This would also indicate that the echo is a multiple reaction of varying intensities from different points, and that at the place of the steamer the fainter ones from a greater distance would be heard, which would be inaudible near the trumpet.

3. The arc of the horizon from which the echo appeared to come was also increased, in some cases, to more than three times that subtended by the echo at the place of the trumpet. This fact again indicates that the echo consists of multiple sounds from various points at or near the surface of the sea, the angle which the aggregate of these points subtend necessarily becoming greater as the steamer advances.

But perhaps the most important facts in regard to the echo are those derived from the series of observations made in regard to it by Mr. Henry W. Clark, the intelligent keeper of the principal lighthouse station on Block Island, and by Joseph Whaley, keeper of the Point Judith Lighthouse. Mr. Clark was furnished with a time-maker to observe the duration of the echo, and both were directed to sound the trumpets every Monday morning for half an hour, noting the temperature, the height of the barometer, the state of the weather as to clearness or fog, the direction and intensity of the wind, and the surface of the ocean.

From the observations made at these two points, for more than two years at one station and over a year at the other, the echo may be considered as produced constantly under all conditions of weather, even during dense fogs, since at Block Island it was heard 106 times out of 113, and at Point Judith 50 times out of 57, and on the occasions when it was not heard the wind was blowing a gale, making a noise sufficiently intense to drown the sound of the echo. These results appear to be sufficient to disprove the hypothesis that the phenomenon is produced by an acoustic cloud accidentally situated in the prolongation of the axis of the trumpet. It must be due to something more permanent in its effects than that from a portion of air differing from that of the general atmosphere in temperature or density, since such a condition cannot exist in a dense fog embracing all the region of the locality of the phenomenon. Indeed, it is difficult to conceive how the results can be produced, even in a single instance, from a fluctuient portion of atmosphere in the prolongation of the axis of the trumpet, since a series of patches of clouds of different temperature and densities would tend to absorb or stifle by repeated reflections a sound coming from their interior, rather than to transmit it to the ear of the observer.

The question, therefore, remains to be answered: What is the cause of the aerial echo? As I have stated, it must in some way be connected with the horizon. The only explanation which suggests itself to me at present is, that the spread of the sound which fills the whole atmosphere from the zenith to the horizon with sound-waves may continue their curvilinear direction until they strike the surface of the water at such an angle and direction as to be reflected back to the ear of the observer. In this case the echo would be heard from a perfectly flat surface of water, and as different sound-rays would reach the water at different distances and from different azimuths, they would produce the prolonged character of the echo and its angular extent along the horizon.

While we do not advance this hypothesis as a final solution of the question, we shall provisionally adopt it as a means of suggesting further experiments in regard to this perplexing question at another season.

BURIALS AT ANCIENT ROME.

THERE were burial clubs at Rome at an early time, and the Christians availed themselves of the same means to bury their dead as their pagan predecessors; the transition was gradual, and in some cases there are pagan sarcophagi and inscriptions still remaining in the Christian Catacombs. There is no need of the theory that they were merely carried there as old marble, to be used again. The subsoil of the Campagna consists of successive layers of tufa of different degrees of hardness. Roads had been made in the beds of softer materials to get out sand, and these subterranean roads formed convenient modes of access to the Catacombs, which were generally made in the harder bed of tufa under that level. The churches outside the walls, grand basilicas as some of them now are, were originally chapels at the entrances of the Catacombs, of which St. Agnes is the best example. The Catacombs are not *under* Rome itself, but two or three miles from it. In an ancient city no one was allowed, except in very rare cases, to be buried within the walls, a wise practice to which we are returning. The paintings of the second and third centuries are quite simple; *e.g.*, the cultivation of the vine in the Catacomb of Praetextatus; of the four seasons in that of S. Nereus. There are no religious subjects before the time of Constantine: the earliest are those of the Good Shepherd and certain well-known Scriptural types. The history of Jonah is common in the fifth century; figures of saints or martyrs appear in the sixth century, and are common in the eighth. The inscriptions are the earliest and most genuine things left; few of the dated ones are before the third century; the larger proportion are of the fourth and fifth, with a few of the sixth and even later, for the family burial-places continued to be in use as long as they were accessible. Unfortunately, most of the inscriptions have been removed to the museums or monasteries, and sometimes there is no record to say from what place they came. A picture in Dr. Northcote's "Visit," page 8, gives a good idea of the subterranean galleries. They are about eight feet high and three wide, and their walls on either side are pierced with a number of horizontal shelves, one above the other, like the shelves of a bookcase. Each shelf once contained a dead body, and they had been shut up by long tiles or slabs of marble, securely fastened by cement, and inscribed perhaps with the name of the deceased or with some Christian emblem. In page 5 there is a plan of the labyrinth of lines in part of the Catacomb of St. Agnes. In St. Callistus, on the Via Appia, we can descend by a succession of staircases to five different galleries of these lines, the fifth being only just above the level to which water rises. Many of the original catacombs were family burying-places secured under the Roman law which allowed tombs and burial-places to be exempted from the rules of succession: "heredem non sequitur" was the principle in such cases. Hence, when a family became Christian, it could easily open its burial-place to other Christians, "ad religionem pertinentes meam" (Northcote, p. 19). The finest inscriptions belong to the time of Pope Damasus, the contemporary of St. Jerome; they are exquisitely engraved in marble. The fatal year 410, in which Alaric took Rome, brought the original use of the Catacombs in great measure to an end. Speaking generally, they ceased to be places of burial, and were thenceforth mainly places of pilgrimage, and were "restored" for that purpose. Vigilius, in 550, restored some of Damasus' inscriptions which had been broken; but art had perished and the workmen were unskilful and ignorant. The inscriptions are perhaps the most valuable of the remains. The paintings link on to the paintings of the age of Roman art, when "the walls of apartments were covered with arabesques, and the roofs were often in the form of arbors hung with garlands, interspersed with fluttering winged forms." Dr. Northcote gives two of the Christian paintings on the roof of St. Domitilla and that of Praetextatus (pp. 67, 69). As Roman art perishes, the paintings become stiff and bad. But the inscriptions are not dependent for their permanent value on the state of art; it is their meaning that is important. De Rossi has studied more than fifteen thousand Christian inscriptions that have come down to us from the first six centuries, but this only represents a part of what once existed. Alaric and Attila may be responsible for part of the loss, but friends are more destructive than enemies, and the marble tombstones were used largely from the eleventh to the fifteenth century, not only in Rome, but even in distant places, for the pavement of churches. Tombstones are perishing among ourselves every year by the hundred; the restorations going on are most destructive, and a copy of the inscriptions is hardly ever taken. We can see by Weever and others who made collections of inscriptions how many of our tombs have perished within the last century or so. The Greek language is common in the earliest inscriptions of the Catacombs, the primitive Roman Church being composed mainly of Greeks and Hellenizing Jews. The Christian literature of early Rome is almost wholly Greek, and the Latin Christian literature comes from Africa. About fifteen hundred of the inscriptions are dated. There is but one dated inscription of the first century, two of the second, two dozen of the third, about five hundred of the fourth and fifth; the rest belong to the sixth. But of the undated inscriptions it is probable that a considerable number belong to the second and third centuries. Each age has its fashion in the wording of such inscriptions, each country its peculiarity. De Rossi's long experience has enabled him to lay down rules on this subject, which are even more necessary than in the case of pagan inscriptions. The three names are not recorded in the old Roman fashion after the third century; even the mention of two names becomes rare; new Christian names come in, such as Adeodatus, Quodvultdeus, and so on, which almost remind us of the Puritan style. — *The Academy.*

AMERICAN INSTITUTE OF ARCHITECTS.

NEW YORK CHAPTER.

THE first meeting of the season of 1878–1879 was held on the 1st instant, President R. G. Hatfield in the chair. The reports of the officers were received and filed; on the election for the coming official year, R. G. Hatfield was reëlected president; E. M. Littell and G. B. Post, vice-presidents; A. J. Bloor, secretary; and Henry Fernbach, treasurer. The standing committees on admissions, on library and publication, on education, and on examinations, were reëlected. Messrs. Littell, Bloor, and Le Brun were appointed a committee to report suitable action on the death of Mr. Richard Upjohn, at the next meeting of the Chapter. Mr. Robertson, of Potter & Robertson, was appointed to represent the Chapter, and act in con-

nection with Mr. Cady of the Board of Trustees of the Institute, in preparing for the Twelfth Annual Convention, to be held in New York, and to open on Wednesday, November 13.

NOTES AND CLIPPINGS.

Trenches in Streets. — The Commissioner of Public Works in New York has issued the following notice: —

> Department of Public Works,
> Commissioner's Office, Room 19, City Hall,
> New York, September 16, 1878.
>
> TO THE PUBLIC.
>
> The rough condition of most of our streets is due in a great measure to the many excavations made by plumbers, builders, and gas companies, for the purpose of connecting houses with sewers, water-pipes, and gas-pipes, the pavements over which are not properly replaced. These excavations in the three hundred and twenty-eight miles of paved streets are so numerous that the Department finds it impossible, with its small force of inspectors, to watch each one, and compel a compliance with the ordinances and regulations, which require that the trench be filled with earth or sand in layers not more than six inches thick, compactly rammed, and the pavement perfectly relaid, and kept in good condition for six months.
>
> All persons are therefore requested to report to the Department every case of failure to comply with these requirements which may come to their notice, giving the location and, if possible, the nature of the excavations and the names of the offending parties. This will greatly aid the efforts of the Department to improve the condition of the pavements, and will confer a public benefit.
>
> Allan Campbell,
> Commissioner of Public Works.

Morocco at the Exposition. — The court of Morocco at the Paris Exposition has an indescribable air of romance about it. It is hung with mats and scarfs of gay, warm colors, and displays an endless variety of attractive knick-knacks, delicately embroidered silk kerchiefs, cigar and cigarette cases and holders, brilliantly illuminated bracelets and necklaces made of an aromatic composition, fantastically embroidered slippers, delicate pastilles, and an astonishing variety of gilt and tinsel ornaments. Everything seems to send forth the most delicious odor. The air is heavy with Eastern perfumes and spices. Olive wood souvenirs in the shape of canes, paper cutters, paper weights, and sleeve buttons are spread temptingly before you. Strange-looking musical instruments, war trumpets, balalaïns (a very primitive sort of piano), spears, guns, and queer-looking dirks and battle-axes appear. Then the tall, handsome Moors, with "liquid eyes" and languishing manners, looking like the stage Othellos in their picturesque red turbouches and flowing many-colored robes, standing in the tent and around the court, add greatly to the romantic scene.

British Schools of Art. — The progress of elementary instruction in art in the British schools is indicated by a late report. The total number of persons taught drawing, painting, and modelling through the agency of the art and science department was, in 1875, 443,689; in 1876, 530,412; and last year, 610,620. The number of students taught in art classes was 20,579; and 549,010 children were taught drawing in elementary day schools, against 460,961 in 1876. During the period of 1873–77 the number of institutions to which instruction is given in drawing or in higher art, with the aid of the department and subject to its inspection, has nearly doubled. The number of persons taught and of exercises and works examined has more than doubled during the same period; while the total amount of the aid given by the department in the form of payments on the results of this instruction, as tested by examinations, has risen from £11,918. in 1873, to £19,360, in 1877, or nearly sixty per cent. The lectures delivered in the Lecture Theatre of the South Kensington Museum were attended by 8,481 persons; the evening lectures to workingmen at the Royal School of Mines by 1,227 persons; and 472 science teachers attended the special course of lectures provided for their instruction in the new science schools at South Kensington. The various courses of lectures delivered in connection with the department in Dublin were attended by about 4,500 persons. The total number of persons, therefore, who received direct instruction as students, or by means of lectures in connection with the science and art department, in 1877, is 681,367, showing an increase, as compared with the number in the previous year, of 81,192, or more than 13½ per cent. The attendance at the art and educational libraries at South Kensington continues to increase.

Manufacture of Railroad Iron. — The Director of the Bureau of Statistics furnishes the following: During the last four years we have been building railroads at the rate of 2224 miles per year. The importation of railroad bars, both iron and steel, fell from 595,321 tons in 1871 to 12 tons in 1877; but the production of iron and steel bars in the United States increased from 2,953,141 tons during the five years from 1867 to 1871 to 4,056,340 tons during the five years from 1873 to 1877, an increase of 37 per cent. The supply of iron and steel railroad bars necessary to meet the demand of our seventy-nine thousand miles of railroad already in operation, for renewals of track and for the extension of track facilities, in order to meet the necessary requirements of traffic, is now about three times as large as the supply required for track-laying on new roads. This production of bars to supply railroads in operation has, in fact, mainly sustained the iron and steel rail interests of the country in their present state of efficiency.

Tompkins Square, New York. — The work of altering the Tompkins Square Parade Ground into a lawn and shrub park has been commenced. Three gangs of workmen, of twenty-five each, are now removing the loam and top dressing from the trench formerly used as a redoubt, which is situated in the southeast corner of the park. The loam is being taken out and will be used as a sub-soil in laying out the lawns in the centre of the park, which is now covered with solid concrete. The mound on the southwest side, formerly used by the regiments as a fort, is to be removed, and the earth and grass which now cover the top and sides will be utilized in filling and levelling the redoubts, etc.

French and English Competition. — In 1874 a law was passed in France somewhat like the English factory acts, under the provisions of which no children under twelve years of age can be employed in mills and workshops. This law, however, is not very efficiently administered, and is, indeed, little heeded by the manufacturers. The hours of labor in England are 56½ per week, against 72 in France. The French manufacturers thus have an advantage of 27½ per cent, without reckoning the benefit they gain owing to holidays being less numerous in France, and from Sunday work. The wages of the work people employed in the woollen manufactories in France are on the average at least 25 per cent lower than those paid in the United Kingdom. It will thus be seen that as regards the relative cost of labor in the two countries the French have an advantage of 27½ per cent in time worked, and 25 per cent in money paid for wages, or together 52½ per cent. But as a larger number of hands is employed in France than in England for a similar amount of work, and as it is undeniable that English work-people as a rule can produce more than the French, it is estimated that these two advantages on the part of British labor reduce the gain of the French manufacturer in time and wages by one half, or, say, 26 per cent. According to this estimate, labor in France costs one fourth less than in England. The proportion of the cost of labor to the cost of materials varies considerably in different articles; but, to show the effect of the additional cost the English manufacturer has to bear, it may be stated that if the total cost of labor for producing an article of fabric is one fourth of the total cost, the French manufacturer would gain 6½ per cent; if one third of the total cost, 8½ per cent; and if one half of the whole cost, 12½ per cent. The French manufacturer can, therefore, produce more cheaply than his English competitor. It is generally admitted that in many classes of goods the French already excel us, and that the French industry is yearly making more progress than the English. In France, too, strikes in the woollen and other industries of this kind are almost unknown. — *Pall Mall Budget.*

The Darien Canal Project. — The friends of the Nicaraguan interocean project are getting uneasy lest England and France may secure control of the route, and the government of Nicaragua is growing restless under the long delay of the United States government in deciding what it intends to do in the matter. The strength of opposition to that project in this country comes from the Panama Railroad Company. This corporation succeeded in defeating the proposed canal during General Grant's administration, and is on the lookout and ready to oppose any revival of the subject. An attempt will be made at the next session of Congress to interest that body in the work. If a failure follows it will be dropped so far as this country is concerned, and the execution of the work be left to the European governments. — *Washington Star.*

A Florida Ship Canal. — The people of Florida propose to build, or more probably to get the general government to build, a ship canal across their State from Mannatee Inlet on the Atlantic to Fort Wool or Clay Landing on the Suwanee River, in order to shorten the passage from New York to New Orleans. It would have, it is said, an excellent harbor at each end of the canal, and no obstructions at either end. There would not have to be more than seventy-five miles of canal cut on this route, and then it would reclaim at least 1,000,000 acres of the best lands in the State. This land, when reclaimed, would be worth the price of cutting the canal, and the whole route would be well supplied with natural feeders.

"The distance from New York to New Orleans by this route would be much less than by any route farther South. It would be from 1,000 to 1,200 miles less than the route now sailed, which would make a difference of from 2,000 to 2,400 miles saved on the round trip, and would save yearly $5,000,000 in the way of shipwrecks, and $3,000,000 annually in the way of extra insurance, over $10,000,000 in freight, and several millions every year in the way of grain and meat which go to waste every year in the great Mississippi valley for the want of a cheap transportation to the seaboard. The canal, when built, would bring in a revenue of at least $8,000,000 or $10,000,000 annually in the way of tolls, especially when the Darien Canal is completed, as it would throw a vast amount of shipping from California, Japan, and China through the Gulf of Mexico, and through the Florida Ship Canal, to New York and Liverpool and other ports."

The Treasures of Cyrus. — A peasant at Michakoff, on the Dniester, is said to have just found, buried in the ground, a treasure supposed to be that of King Cyrus, conqueror of Croesus. It consists of a crown, goblets, clasps ornamented with dragons' heads, sceptres, etc., all of gold, and representing, in weight of that metal only, a sum of 250,000 francs. They have been examined by the archæologist Praglowski, who declares them to be of Persian origin. He supposes them to have belonged to King Cyrus, and to have been buried there by his attendants on his defeat in the battle of Massagetes, in which, according to some writers, he lost his life.

Cloister of St. Paul's. — In excavating in St. Paul's Churchyard, London, the foundation of the cloister and chapter house of the old cathedral have been discovered, the marble carvings of the fourteenth century being in excellent preservation.

Dr. Schliemann in Ithaca. — Dr. Schliemann is said to have obtained permission from the Greek Government to begin excavating at Ithaca.

A Fortunate Architect. — William H. Hume, an architect and builder in New York, who was severely injured in February, 1867, by the fall of an awning at One Hundred and Twenty-fifth Street and Fourth Avenue, New York, sued the city to recover $15,000 damages. The case has been to the Court of Appeals, which renders judgment in Mr. Hume's favor. The judgment, with costs, amounts to nearly $24,000, and was yesterday entered in the New York County Clerk's office.

An International Park at Niagara. — Lord Dufferin has proposed to the governor of New York that that State and the Dominion of Canada shall unite in buying up whatever rights as against the public may have been acquired by corporations or individuals in the land around the Falls of Niagara, and shall hold the falls and adjacent land as a public park wholly natural and unsophisticated.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. IV.] Copyright, 1878, HOUGHTON, OSGOOD & Co. [No. 147.

BOSTON, OCTOBER 19, 1878.

CONTENTS.

SUMMARY: —
Explorers vs. Archæologists. — The Elgin Marbles and the Uffizi Gallery. — Mr. Woolner and the Copyright Commission. — Artistic Copyright. — The Boston School of Drawing and Painting. — The Liverpool Theatre Disaster. — Responsibility for Accidents. — The Mississippi Jetties . . . 129
THE OPEN FIRE-PLACE. II. 131
THE ILLUSTRATIONS: —
Church of St. Paul's, Rome. — Kindergarten at Winchester, Mass. — Shops and Offices, St. John, N. B. — Mantelpiece . 132
CORRESPONDENCE: —
Letter from Boston. — Letter from Chicago. — Letter from St. John, N. B. 132
THE BOLOGNE LIGHTHOUSES 134
COMMUNICATIONS: —
The Ownership of Drawings 135
BOW CHURCH 135
NOTES AND CLIPPINGS 136

THE reproach has more than once been brought against modern archæological explorers that they were too exclusively interested in what they could carry away, and made too little account of what they had to leave behind; that the zeal of the collector overbore that of the investigator. It is doubtless true of the two most successful of recent explorers, Dr. Schliemann and General di Cesnola, that their explorations would have been still more valuable if they had taken as much pains to critically examine and record the architectural and structural remains among which their treasures were found, as to secure the treasures themselves. Some negligence in this respect is very natural in men whose archæological study is the fruit rather than the seed of their explorings, and who set about their work with the eye of an untechnical observer, to which swords and bowls are in themselves more interesting objects than walls or broken capitals, quite independently of their bearing on the special problems of archæology. Continental archæologists have brought a like complaint against some of the various English explorers — even Mr. Newton himself — who have been assisted by the British Museum, or have worked with an eye to it, alleging that in their eagerness to increase the Museum they have paid attention only to such artistic movables as could enrich it, and have lost many opportunities to advance the world's knowledge by more thorough exploration; and even Englishmen, from Byron's day to ours, have cried out against Lord Elgin's high-handed plundering of the Parthenon. Thoughtful people have agreed that these complaints are more or less true, and ought to be kept in mind, in order that what is done hereafter may be more easily done, but they have consoled themselves by reflecting that the benefit of the museums to art and science far outweighs the errors of inconsiderate collectors; and that the Elgin marbles are both more useful and more honored where they are than if they had been left to clothe the Parthenon or had found their way into the Greek Museum, where they would have remained, like many other precious relics, uncared for and inaccessible.

THIS compensation also is doubtless real, but it appears in its turn to have its counterpoise. The zeal of conservation has often shown itself as formidable as neglect or even violence. We are used to this in architecture; the ravages of the restorer of paintings are proverbial, but it takes one by surprise to be told that the wonders of Greek sculpture are dying a slow death at the hands of their friends. A gentleman who was in England not long ago wished to bring home copies of some of the Elgin marbles to form part of a collection for the use of students, and applied to have casts taken from them. He was told that he could have them made, but that he would do better to take them from moulds made thirty years ago, because the sculptures themselves had deteriorated since then. On careful comparison of the early casts, he found that this was literally true. It is the custom, it seems, to preserve these marbles from deteriorating influences by rubbing them once a week with cloths. This conservative process, which in the course of thirty years would give some fifteen hundred rubbings, has in that time visibly affected the sculptures. Fifteen hundred impressions, indeed, would tell on a copper plate; it is not surprising that they should have their effect on the marble relief. It appears that a similar care is taken of the pictures in the National Gallery. These — excepting the Turners, which have for safety's sake been put under glass — are wiped over with a silk cloth every week. This process, gentle as it may be, must tell upon them also in time, if it has not already; but the English conservancy is tenderness itself compared with what we see elsewhere. The French habit of scraping off a film from the sculptures of a building whenever they get darkened by time is well known, and it is not long since we quoted an account of the tooling over of the carving in the Cathedral of Florence. These things, too, are mild compared to the treatment which pictures may undergo even when they are not repainted. The pictures in the Uffizi Gallery, the most precious collection in the world, not long ago narrowly escaped a wholesale cleaning with acid after the invention of some ambitious Italian. Fortunately a preliminary experiment was tried on a single picture; it was disastrous enough to arouse even Italian indifference, but there was some difficulty in checking the process.

THE English Royal Commission on Copyright continues its study of the question of copyright in works of art, and we find in the *Architect* of September 28 a report of the evidence given before it by Mr. Thomas Woolner, R. A. Some of Mr. Woolner's answers to the questions of the commission are noteworthy, if they indicate what are the common ideas of his fellow artists on this subject; and from his professional standing we may presume that they do. They lead us to infer, what we might have imagined, that while artists are anxious in a way to secure for themselves a protection in their work like that they see secured to authors, they really take little care to use the advantages that the law allows them, or even to inform themselves what these advantages are. Thus, Mr. Woolner, when reminded that sculptors could protect themselves against copies by registering their works, could not remember that any of his profession had ever done so in a single case. It would appear that English artists do not even care to acquaint themselves with their rules of registration, for the eminent sculptor, whose works have been before his countrymen some thirty years, during which time the provisions have been changed by law twice or more, when questioned concerning these provisions could only recur to what he had heard concerning them when a pupil. At present the English law provides that copyright on works of sculpture can be secured for fourteen years, with right of renewal for fourteen more, on registration by means of a copy, drawing, print, or description, according as the registrar shall determine; but this gives security against copying only, and not against reproduction by engravings or photographs. Mr. Woolner argued that the copyright should be assimilated to that in books, which runs to forty-two years at least, or seven years after an author's death, and should be a defence against engravings and photographs as well as against copies. At the same time he acknowledged that such reproductions were rather a benefit than an injury to an artist, because they increased his reputation.

WE suppose it may be assumed that artists everywhere have much the same feeling as Mr. Woolner. They do not want, that is, to be troubled with registering; they want all that anybody has in duration of right, and they want to be protected against unauthorized prints and photographs, more, after all, as against an infringement of dignity than as against any pecuniary injury. The truth with them is that the business aspects of the protection, to use the phrase of an old army officer concerning some special duty, do not suit the shape of their minds; yet it will be difficult to induce legislators to consider other aspects of it. It is not easy to see how any system of copyright can be made to work satisfactorily without registration, which, however, can be made sufficiently easy, as Mr. Woolner himself suggested, by filing photographs. Prints and photographs may fairly be forbidden, not merely because artists feel themselves entitled to suppress them, — for this, though it be reasonable, will not appeal greatly to the average lawgiver, — but because the right to make them, being a source of profit, and therefore merchantable, belongs of right to the artist who created it with his work. But it will hardly be best to try to extend this, as some favorers of architectural copyright would have us, beyond actual representations taken from the object itself, for the authorship of ideas in these days is a very inscrutable and slippery thing. As for the duration, there is not the same reason for extending the protection over works of art as

over books, for with the multiplication of these, if they are republished, the protection is a continued source of revenue, which it is not with a work of art. The proper analogy, if it could be made to work, would be in giving the artist, or his heirs, a royalty for a fixed period on the increase of value which time and a growing fame added to his works after they had passed out of his hands. This would not be unreasonable, and would cure many a case of cruel injustice; but we fear it would be difficult to make it prevail.

The second annual report of the School of Drawing and Painting attached to the Boston Museum of Fine Arts gives a good showing of the progress of the school during the last year, while the new year begins with a larger number of students than ever before. The whole number of students received during the year was a hundred and sixty in the day classes, of whom a hundred and twenty were women; and sixty-three, men and boys only, in the evening classes. The students in the painting class were ninety-seven; whether all of these painted from the models, who sat every day, we are not told, but the life classes have been naturally the principal feature of the school. The greater part of so many pupils being women, it is fair to infer that comparatively few will become professional artists; yet the whole curriculum and discipline of the school have been arranged with a view to professional training. The attendance of last year, and the work shown to the public at the end of the session, indicated that the training at least was not slackened to suit the liking of amateur pupils, and the zeal of the students was shown in their forming a sketching club, which included the greater number of them, says the report, and occupied the painting room during off hours with voluntary work. The most interesting experiment of the year was the course of modelling which was introduced into the curriculum. Although this was confined to the figure, it was not arranged as a class for students in sculpture merely, but as part of the regular work of every pupil, in order, as the report says, "to give a more intimate knowledge of form and a readier perception than drawing alone could give." We suspect that this is the first example where the modelling of the figure has been made an essential part of the instruction of a large school of painting for both sexes, and we could wish it might have a thorough trial. We are inclined to think such a study a very important help in the training of painters of the figure, giving as it does a fineness of knowledge and conception that is only to be acquired by much longer labor in drawing alone. Unfortunately the teacher at the school, Mr. Dengler, an artist from the Munich school, whose work and instruction were full of promise, was obliged by failure in health to break off his course. The experiment, however, had lasted long enough — we quote again from the report — "to show that while the value of modelling as an educational and disciplinary exercise had not been overrated, there yet were difficulties which had not been counted on in the way of making it part of the regular work of the school. For while a certain number of the students greatly enjoyed the work, and others, though not caring much about it, highly appreciated the advantage they derived from it, to others it was positively distasteful, and to a certain number, particularly among the young women, it seemed to be injurious to the health, either from the fatigue of the unusual exertion or from the unavoidable dampness of the workroom."

The horrible disaster at the Colosseum Theatre in Liverpool, a few nights ago, reminds us again that the things which crowds dread are not the things that injure them. It shows conspicuously that what an audience most dreads is fire, and that their fear itself is the fatal thing to them. A mere squabble in the pit was enough to make some foolish person catch at the idea of fire and scream it out; then the audience at once grew frantic, and three dozen of them were trampled to death. The most perfect fire-proofing would not have helped the matter here, for no fire-proofing is so safe as the absence of fire. If a theatre should be built with absolutely no material in it but brick and iron, and planned as theatres are commonly planned, an alarm of fire in it would still certainly be fatal. No doubt some adventurous managers will hasten to conclude from this calamity that fire-proof construction is after all of little avail and not worth its cost, but there can be no doubt that an actual fire would have added enormously to the loss of life among the people — four or five thousand, it is said — who were in the theatre, as it did in the case of the Brooklyn Theatre. It only proves once more that the greatest danger is of panic, for it is that which adds the chief peril to fire, while without fire at all it is still itself a deadly peril. Therefore while an incombustible construction is a *sine qua non* in a properly built theatre, the most unpardonable sin is difficulty of egress. The Liverpool theatre, we are told, while it was enormously large, was intricate in arrangement and hard to get out of. The exits converged into a narrow space, where bodies were piled up six or seven deep. A standard which divided the doorway so obstructed the crowd that they were blocked until it was driven away with an axe, — an illustration of a theory which has found some favor, that it is a good thing to put obstructions in the way of an escaping crowd, so as to prevent its injuring itself by going too fast. Unfortunately if there is one thing that the proprietors of theatres are more unwilling to provide than a proper construction, it is sufficient means of exit; the one costs money, the other both costs money and consumes space. The desire for large houses and the call of the multitude for cheap amusement are arguments which they cannot of their own strength resist. It is imperative then in the legal regulation of theatres to insist that they not only shall not burn easily, but shall be planned from the beginning with plenty of outlets expanding towards the exterior, and so arranged as to subdivide and distribute the audience as it retires.

The accumulation of fatal accidents which are the results of carelessness in construction is beginning to make people realize that it does not do to slur our accountability for them. A coroner's jury, in the case of the man who was killed by the fall of an elevator in the building of A. T. Stewart & Co., New York, though apparently unwilling to directly ascribe the death to negligence, has declared in its verdict its belief that the elevator was not in proper order, which amounts to the same thing. The evidence showed that the pawls of the elevator had manifestly failed to do their duty in catching it when it fell, being probably clogged with congulated oil. There is every reason to ascribe this to neglect in not keeping the machinery in proper order, and every reason to suppose that a great part of the elevators in the country are in the same condition, since experience makes it clear that appliances which are kept unused, intended to be ready in emergency, are seldom in condition for use when they are wanted. The coroner's juries on the explosion of the boiler of the Adelphi at Norwalk go further, and declare unshrinkingly that "the boiler exploded because of overwork and overpressure, legalized by a United States statute, increased after shiftless inspection, and persistently used by the attendants in charge after there was sufficient evidence of its dangerous defects." The Massachusetts Railroad Commissioners have indicted for manslaughter the conductor to whose mismanagement they have traced the fatal collision which happened a few days ago on the Old Colony Railroad. On the other hand, the coroner's inquest on three men killed lately by the breaking of a scaffold on the New York Elevated Railway has ended in a verdict of accidental death, but with the significant recommendation that henceforth a competent person should be appointed to select timber for the scaffolds. We shall succeed better in these things when the public grasps the idea that the penalties which are to be inflicted in such cases are not vindictive, or of the nature of personal punishment, but necessary and merciful precautions for the general safety.

Captain Brown's report to the Secretary of the Treasury on the progress of Captain Eads's Mississippi jetties shows that the scouring action due to the jetties has lowered the bottom over about one and a quarter square miles in front of the South Pass by nearly two feet during the past year, which represents a scour of 2¼ millions of cubic yards. In this deepening process the curve of 40 feet depth has receded shorewards 117 feet, the 50 foot curve 228 feet, the 60 foot curve 190 feet, the 70 foot curve has advanced 16 feet, while the other curves out to 100 feet have receded. The minimum depth of the channel has increased between July 28, 1877, and July 15, 1878, from 20.3 feet to 22.3 feet. The length of the shallow between the 22 feet curves at the one date and the corresponding 21 feet curves at the other remaining nearly the same, — from 150 to 160 feet; 12,500 cubic yards of stone and 4,000 cords of willow have been laid in the east jetty during the year, and 5,500 yards of stone with 1,400 cords of willow in the west, to which are to be added 1,200 cords of willow and 200 yards of stone in the wing-dams.

THE OPEN FIRE PLACE. II.

PRACTICAL EXPERIMENTS ON THE WASTE HEAT AND AIR CURRENTS.

In the fire-place represented in Figs. 1 and 2 (see page 116, *ante*) the back measures 2,500 sq. cm., the sides 500 each, the bottom 500, and the top 350, as per accompanying diagram, making in all 4,350 sq. cm., against 2,500 for the opening in front, so that the rays entering the room directly amount to $\frac{2500}{4350+2500}$ or, considering the portion intercepted by the grate, to about one third of the whole, or less than 8 per cent of the entire heat generated by the fuel.

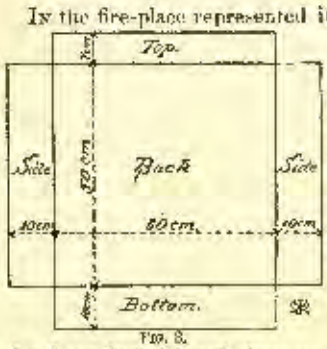


FIG. 3.

To this 8 per cent must be added something for the return radiation from the brickwork, because, although a large portion of the radiated heat, striking the walls of the fire-place, is carried off by contact of the cold air entering the chimney under the influence of the draught, which, as we have seen, amounts to from five to fifteen hundred feet a minute, and part is absorbed by the brickwork, yet a certain portion is returned by radiation and reflection into the room. A simple calculation will give us the amount accurately enough for our purposes. The fire-place represented in our figures being small and blackened with smoke on its sides as well as back, no *reflected* heat could be counted upon. Moreover the radiating power of these walls being inversely as their reflecting power, what we lose in reflection we shall gain in radiation. The surface of the back, sides, and bottom measures 4,000 sq. cm. According to Peclet 1 sq. metre of brickwork radiates 3.55 units of heat per hour for 1° C. difference of temperature between the radiating and the receiving surfaces. Therefore 0.4 sq. m. would radiate 1.44 units per hour per 1° C. The temperature of the

TABLE II.

Time	Average Temperature of Back of Fire-place	Thermometer at 60 cm. from fire.	Thermometer at 1.20, from fire.	General Remarks.
3.32	—	19°	19°	Fire lighted.
3.37	—	45	32	Full blaze.
3.42	—	64	43	Declines.
3.47	—	75	48	
3.52	215°	90	41	Fire out.
3.58	210	65	34	
4.4	190	38	30	
4.10	165	31	27	
4.16	135	30	26	
4.22	115	27	24	
4.28	100	26	22.5	
4.34	90	24	22	
5.34	70	23	20	
6.31	40	20	20	

walls of the fire-place is shown in the second column of Table II., thermometers being placed in different parts of the back of the fire-place and the average temperature being taken. While the fire is burning brightly the radiation from the walls of the fire-place would be partially intercepted by the fire itself; but taking the average temperature of these walls during the first twenty minutes at 220° C., and supposing that only one half the radiation of these walls was intercepted by the fire, fuel, grate, etc., and finding 20° C. to be the average temperature of the objects in the room, we have $\frac{220-20}{2} = 100°$.

$\frac{1.44 \times 100}{3} = 48$ heat units.

During the next six minutes the average temperature per minute being according to the table 210°, we have $210 - 20 = 190°$, from which we have, by calculating as before, 27.3 units radiated. Continuing the calculation in this way for each portion of the time, we have, for the total amount of radiation from the walls of the fire-place, 270 heat units.

Of this we may assume that one half was radiated into the room and the other half lost, and we have 135 units ($= \frac{1}{0.6} \frac{8}{5}$ or $\frac{1}{5}$ of the radiated heat striking the walls of the fire-place) returned into the room to be added to the 826 units, or 8 per cent, of direct radiation. This gives 961 units, or a little less than 9 per cent of the whole heat generated, for one result. According to Peclet only 6 per cent is realized instead of this 9 per cent.

As for reflected heat, under certain circumstances a small amount may be added to the above results when the sides of the fire-place are kept white, or are tiled and of the proper inclination for reflecting the rays. We may take it for granted that the back, top, and bottom reflect only half as much as the sides. Supposing the sides reflect one third of the heat falling upon them, and that they occupy one fourth of the entire surface of the fire-place, as in our case, we have $\frac{1}{2} \times \frac{1}{4} \times \frac{8}{3} = \frac{1}{12}$ of the whole reflected heat, or in our case $\frac{1}{12} \times 825 = 46$ units, or about 0½ per cent. Add 0½ per cent for the back and bottom, and we have 0¾ per cent of the entire heat generated as the amount which may be added for reflection. Inasmuch, however, as the radiation diminishes as the reflection increases, this may here be neglected.

Duclot's experiments show that the radiation from heated bodies is much greater in proportion at very high temperatures than at moderate temperatures. But we have not added anything to our figures for this, because we consider it more than balanced by losses in other ways, such as that due to imperfect combustion of the fuel, for which we have also made no account. It is estimated that with the ordinary fire-place, about one eighth of the fuel is wasted in unconsumed smoke.

Our 9 per cent so far found must, however, again be modified, in consideration of the heat taken from the room by the cold air entering the doors and windows under the influence of the draught.

In our case we have by Table I. an average of 883 cubic metres of air, which must have passed through the room and into the fire-place from the outside. The average temperature of the room and objects contained in it having been raised one degree by the combustion of our three kilograms of wood (the doors and windows having been kept closed during the experiment), we have $883 \times 1 \times 1.29 \times .24 = 258$ units, or $\frac{258}{961} =$ about ¼ of the whole. Deducting 258 from 961 we have 703 units, or only 6 per cent of the heat generated by the fuel, for the total amount of heat which can possibly be utilized from wood fires under the best conditions and most perfect form of ordinary fire-place, to say nothing of the fact that where the rooms are provided with the so-called ventilators near the ceiling, even this little heat is carried off almost as fast as it is formed!

Deducting from the 10,770 units generated by the fuel the 703 units utilized by radiation and the 5,079 units escaping through the chimney mouth into the atmosphere, together with the eighth lost in unconsumed smoke, capable of generating 1,540 units, we have 3,660 units for the amount absorbed in the brickwork. Of this nearly 1,000 units were absorbed in the upper half. The remaining 2,660 must have been taken up by the lower half. In these experiments, however, the flues were cold at the outset and the absorption on the part of the masonry was at its maximum. In winter, when the flues are kept constantly heated, but little is absorbed by the brickwork, its power of absorption being limited by the low conducting power of the material, and the amount lost at the top of the chimney is correspondingly greater.

With coal fires more of the heat of combustion is utilized. Supposing that, under the best of circumstances and with coal having the greatest radiating power, we adopt the figure of Peclet of 50 per cent for the radiating power, we have, as before, $.50 \times \frac{1}{3} + (\frac{2}{3} \times \frac{1}{3}).50 = .24$. From this 24 per cent deduct, as before, one quarter for the amount returned up chimney by the draught, and we have 18 per cent for the total amount utilized, under the best possible circumstances with the best possible fuel. According to Peclet only 12 per cent instead of 18 per cent is realized from a coal fire.

RESULTS OF EXPERIMENTS.

Our experiments present the following curious results; —

1. Our three kilograms, or 6½ pounds, of wood served to raise the average temperature of our room less than one degree Centigrade, although the heat generated by the wood was sufficient to raise the temperature of 14 rooms of equal size from freezing to 68° Fahrenheit. (The room measured 20 × 20 × 10 feet.)

2. While our fire-place was only sufficient, with three kilograms of dry wood, to maintain the temperature of the room at 1° C. (supposing the outside air stood at 0° C.) for a few minutes, the heat actually generated was sufficient to maintain the temperature at a little below 20° C., or 68° F., and to pass fresh air, raised from freezing to 68° F., through the room for ventilating purposes at the rate of one cubic metre a minute for two days of twelve hours each!

3. Supposing again that the outside air stood at the freezing point, we shall see by consulting the third column of Table II. that a person or object standing 50 cms. distant from the fire would have been heated by radiation up to 75° — 20° = 55° C., or 131°F., while the air flowing by him into the fire would have stood scarcely a degree above the freezing point. At this distance three men would intercept nearly all the heat of the fuel, and all other parts of the room would fall to the freezing point. This radiated heat itself would last at 55° only about five minutes, when it would fall 15°, after which it would continue to fall as shown in the table.

At a distance of one metre, a person would be warmed only to 48 — 20° = 28° C., and six men would appropriate the greater portion of the heat of the fire, which would last, say, five minutes, and then fall 9°. At a distance of two metres a person would be warmed (according to another experiment not here recorded) only 7° C., and at a distance of four metres only about 2° C. But if he happened to stand anywhere in the room sheltered from the direct radiation of the fire, he would enjoy a temperature scarcely half a degree above the freezing point of water.

4. According to our table three kilograms of dry wood cut small served to give a bright fire only ten minutes, and burned out entirely in twenty minutes. To keep a bright fire burning, as in this experiment or as is done in many houses in cold weather, for a day of twelve hours would therefore require 144 kilograms of wood, which according to Rumford are capable of producing $10,770 \times 144 =$ 1,550,880, or one and half million units of heat, which, if all were utilized in the proper manner, would be enough to keep the temperature of the room up to 68° F. in freezing weather for about ninety days of twelve hours each, equal to three months, or all winter, and give a change of pure air equal to one cubic metre a minute, heated,

say, up to 60° F., for ventilation, during the whole time, it being supposed that the adjoining rooms and those above and below were inhabited and maintained at the same temperature, that the outside wall was double as well as the window, and that the door and window fitted well and were kept closed.

THE IDEAL FIRE-PLACE.

What now would be the action of a fire-place and flues ideally perfect?

Ideal perfection would imply:—

1. That all the heat generated by the combustion of the fuel be utilized in heating and ventilating the house, and that the combustion of the fuel be complete.

2. That the supply of fresh air introduced into the house to take the place of the foul air removed be guaranteed perfectly pure; warmed in winter to a temperature somewhat below that of the room; moistened enough to give it its proper hygrometric condition; abundant enough to supply amply the fire and the occupants; so distributed and located at its entrance as to cause no perceptible draught at any point; the gentle air current so directed that it should reach every part of the room; so steady that no part of it should pass over the same spot twice or be twice breathed by the occupants; and so regulated by simple valves as to be under perfect control.

3. That the flues include a special gas ventilator so arranged that all the heat generated by the combustion of the gas should be retained in the room and utilized, while the injurious products of combustion should be carried off.

4. That a complete ventilation of the rooms be effected, both in summer and in winter, without opening doors or windows.

5. That the chimney never smoke.

6. That the construction of the fire-place and flues be simple, durable, inexpensive, safe, and unobjectionable in appearance.

The open fire-place as ordinarily constructed, so much overestimated as a ventilator, satisfies the requirements above enumerated, to the following extent:—

1. Only from five to fifteen per cent of the heat generated by the fuel is utilized in heating and ventilating the house. It must be borne in mind that that is not ventilation which provides only for the outlet of the air and ignores the inlet, and that a hundredth part of the heat of the fuel would be ample to abstract the foul air far more efficiently, if properly applied, than is done by the eighty-five or ninety-five per cent now used.

2. The air introduced to take the place of the foul air removed is not guaranteed pure, but its purity or impurity is left entirely to chance. If the windows are tight, the fire draught will be supplied from the halls, neighboring chambers, or even water-closets and toilet rooms, or, in other words, from soil and drain pipes, bringing poisonous gases and perhaps disease into the house; or, if disease be already there, distributing the noxious air from the sick-chamber into other parts of the house.

If the windows are not tight, the air entering will be too cold in winter, too hot in summer, and always loaded with whatever dust, dampness, or impurity may happen to be in the outer air, to the detriment of the lungs as well as of the furniture of the inmates.

Or, finally, if both doors and windows are closed and tight, as may sometimes happen with careful carpentry and especially at night in bed-rooms, either the air must come in through the chimney itself, causing the fire to smoke, or else no air is admitted, and suffocation is the result.

The history of ventilation furnishes numerous sad cases of such suffocation, cases where the smouldering fire and the sleeper, rendered insensible by smoke or gas, have evidently long struggled for life before either or both succumbed to the want of air.

We may add here that even when the supply of air chances to be pure enough, and abundant enough, and warm and moist enough, and otherwise satisfactory in its quality, it is still unable to ventilate the apartment properly because it is drawn directly up the chimney before it has had time to receive the necessary amount of heat to cause it to rise to the level of the heads of the occupants; while the impure air formed above the level of the mantel, and heated by the lungs and by the gas burners, rises to remain a long time in the room and be breathed over and over again. Or, if special openings are provided above to carry off this upper stratum, what little pure air warmed by contact with the walls, heated by radiation, manages to rise above the mantel, is, as before said, carried off with the impure air almost as fast as it is formed. Thus it often happens with large fire-places and flues that the cold air enters faster than the warm air is produced, so that the more the fuel is piled on and the fiercer the fire the more powerful become the freezing draughts and the lower the temperature of the room.

3. The gas burners are seldom properly ventilated and sometimes not at all. Breathing foul air is as injurious as drinking foul water, yet, while we would shrink with disgust from the idea of drinking water into which the drainage from our houses was known to flow, we allow our gas burners to pour forth a continual stream of carbonic acid and other poisonous gases into our small reservoirs of breathing air, already sufficiently polluted by the exhalations from our bodies and lungs, without giving the matter a passing thought.

4. Complete ventilation in summer as well as in winter is, under the average construction, impossible without opening doors or windows.

5. The chimney often smokes.

6. In one respect our fire-places and flues appear to approach the ideal, and that is in their simplicity, but is it not the simplicity of ignorance rather than that of science?

In order to be able to judge as to how far we may expect to approach our ideal, it will be necessary first to familiarize ourselves with some of the most important devices already tried or recommended by those who have given the subject most attention, and to study the causes which have thus far rendered their adoption so limited.

Many of these devices appear so excellent that it is hard to understand why they were not seized upon at once. But we must bear in mind that the majority of the public are aware neither of the waste of fuel they actually experience, nor of the importance of good ventilation. The style and color of the grate and mantel are of more importance than the construction of flues and all parts which are out of sight. That the pattern and color should be in accordance with the latest fashion is more important than either; and to expect fashion to yield to mere sanitary considerations would bespeak ignorance of one of the most marked peculiarities of human nature.

Then too we know how prone every Yankee builder is to avail himself of his liberty "to follow his own nose by way of a guide-post in the matter of a little science," and how loath he is to leave the beaten track.

These considerations, and the fact that many reject on principle all novelties, on account of the difficulty of distinguishing the good from the bad, are sufficient to render any persistent effort to improve our time-honored forms of building construction most onerous and discouraging, and it would be folly to expect even the most evident improvement, in a matter of this kind, to meet with anything more than a slow and partial recognition.

THE ILLUSTRATIONS.

CHURCH OF ST. PAUL, ROME. MR. G. E. STREET, R. A., ARCHITECT.

This illustration, which we reproduce from a past number of the *Architect*, is a view of the church which Mr. Street designed for the Americans in Rome, a description of which appeared in the letter from London which we published last week.

KINDERGARTEN AT WINCHESTER, MASS. MESSRS. J. R. OREN AND GEO. D. RAND, ARCHITECTS, BOSTON.

This building was recently erected for Mr. D. N. Skillings on his estate of Rangely Place, and is known as Rangely Hall. The school-room is 28 by 36 ft., and is finished into the roof, the gable windows being filled with stained glass. The fire-place, including the whole breast, is laid with face brick, and is made an effective feature of the interior.

SHOPS AND OFFICES IN ST. JOHN, N. B. MESSRS. McKEAN AND FAIRWEATHER, ARCHITECTS, ST. JOHN.

This building was begun in the fall of last year and completed in the winter months. It is built of brick and faced with red pressed bricks, chocolate-colored enamelled bricks being introduced in patterns. The string courses and bands are of freestone. The whole building is now used as the Custom House of the city.

MANTELPIECE DESIGNED BY MESSRS. FICKEN AND SMITH, ARCHITECTS, NEW YORK.

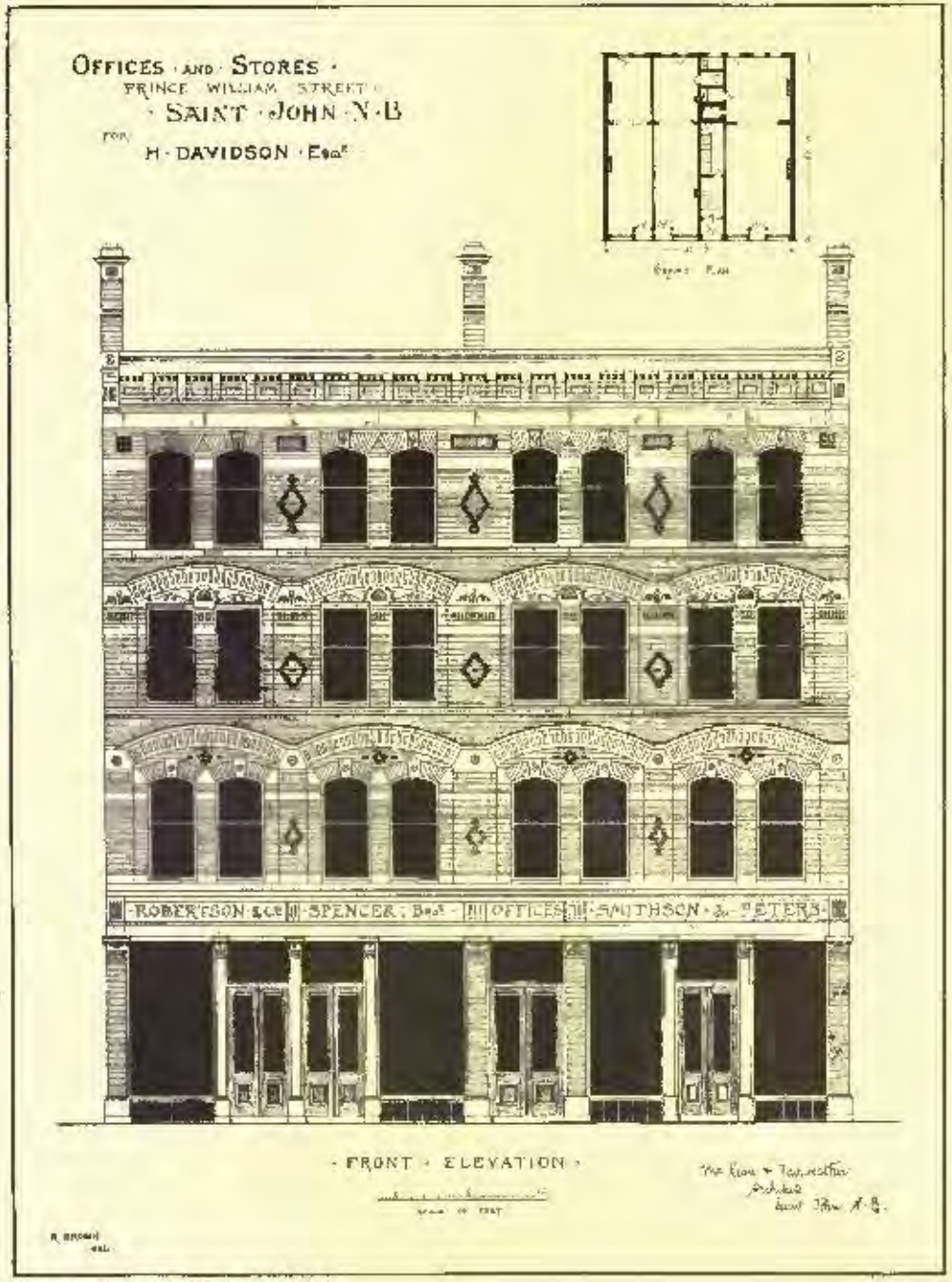
This mantel was highly finished in walnut, carved with especial care. Bevelled glass and polished brass were used to lighten the dark color of the wood.

CORRESPONDENCE.

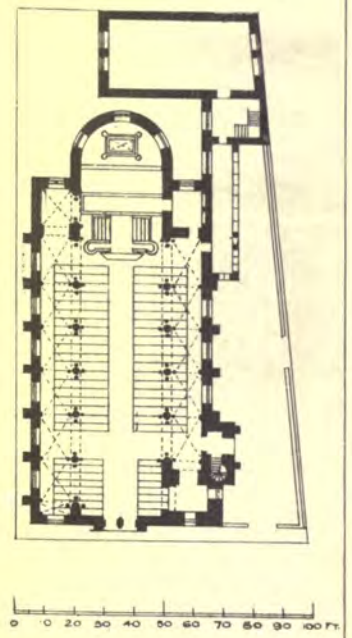
THE MASSACHUSETTS CHARITABLE MECHANIC ASSOCIATION'S EXHIBITION.

Boston, October.

The Mechanics' Fair is at first sight rather disappointing. Since the last fair was held, now four years ago, the Centennial Exhibition at Philadelphia has shown to all classes of the people what may be done both in the way of getting together a great and ful. display of products of art and industry and of showing them to the best advantage. It was but fair to expect that the influence of that exhibition would be seen, if not in the quality of the things exhibited, at least in the arrangement and display of them in a building erected by the association for the purpose. The contrary is the case. I am disposed to think that in no one of the previous fairs of this association have the goods been thrown together with less apparent regard for the effect they would produce on the visitor. This is partly due, no doubt, to the crowding of the building. The aisles and passages are all extremely narrow, and quickly choked by a very moderate crowd of visitors. But it is due in a much greater degree to a certain incapacity in the average exhibitor to select and combine his goods and arrange them with that happy and instinctive good taste and ingenuity which characterizes the artisans and shopkeepers of foreign lands, and to a less extent those of other parts of our own. The government of the association, also, or that one of its committees having charge of the disposition of the floor space, has its share of the responsibility to bear, in assigning the space to the various applicants evidently without regard to the character of the exhibits, or to the way in which one class of goods was to set off another next



The Heliotype Printing Co. 220 Devonshire St. Boston.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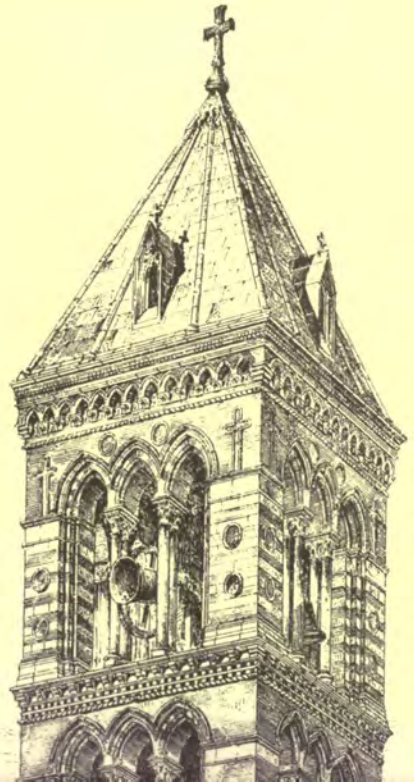


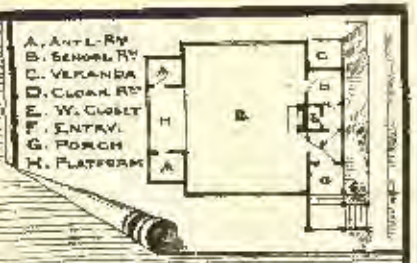
THE HELIOTYPE PRINTING CO. 240 Devonshire St Boston

CHURCH OF ST PAUL AT ROME

G. E. STREET, R.A. ARCHT

American Architect and Building News Oct. 19 1878.

D.N. Skillings Esq.
Kindergarten
at
Rangely Place,
Winchester,
Mass.



J.F. Ober & G.D. Rand
Architects,
Boston.

The Heliotype Printing Co. 330 Devonshire St Boston

it. Accordingly, we find a tremendous pile of somewhat dowdy calicoes overtopping, on the one hand, a shining case of silverware and jewelry, and, on the other, an exhibit of Portland cement and fire-brick. The machinery, which in the old fairs, if I remember rightly, used to occupy a distinct portion of the great hall over the Quincy Market, is here massed on the centre of the principal exhibition room, and there is no escaping the thunder of the rock-drill, or the deafening clatter of the great woolen loom. But apart from the unfortunate absence of arrangement, one is struck by the commonness of the things exhibited. Hardly anybody seems to have thought it worth his while to produce anything of more than ordinary excellence or beauty for this display. Many of the exhibitors make every day a more interesting show in their shop-windows than at this fair. Add to this that the building is rather barn-like (which of course it must be in the nature of the case), that it is painted in somewhat dull and dusty tones of color, and is almost entirely destitute of decorations, and the result of a general view is apt to be a little *triste* and depressing.

A more careful inspection, however, will modify this first impression. If we can't be greatly amused we shall do well to allow ourselves to be instructed. The practical side of life is after all of the first importance, and at a Mechanics' Fair it is unreasonable to adopt the view of that modern epicurean who said, "Give me the luxuries of life and I will dispense with its necessaries." The characteristic of all these fairs has been the clever devices for improving and cheapening manufacture. Here we have the Yankee mind at its best and happiest; it is in this field that all our modest triumphs have been won abroad, and are likely to be, for a generation or two longer at least. In all the departments of art, great and small, we do but follow, however worthily; here we lead. The closeness with which the mind of the inventor follows the working of every piece of machinery, detects every weak point and strengthens it, perceives every opportunity for saving a minute of time, or a stroke of labor, and keeps the machine always abreast of the requirements, or contrives a new one which will do the work of half a dozen of the old, is a national characteristic. On the floor of the main hall, side by side, each in its small glass case, are two very striking examples of this passion for contrivance, and for making machinery do the work of human fingers, which is year by year bringing this country into the place so long occupied by England at the head of the manufacturing nations of the world: the Mosely watch-makers' lathe and attachments, made at Elgin, Illinois, and a complete set of watch-makers' tools, made by the Hopkins Watch-Tool Company of Waltham. The extreme beauty and delicacy of these little tools makes it easy to believe in the precision and uniformity of workmanship which has carried despair into the hearts of the Swiss watch-makers since the report of their representative at Philadelphia two years ago. In most emphatic contrast to this small engnery is the ferocious rock-drill, which under the impulse of its air-compressor alongside delivers its sharp and solid blows on an unresisting block of granite with a force which makes them felt as well as heard throughout the building.

Probably there is no single invention on which so much of incessant labor and ingenuity have been expended in improving, lightening, simplifying, and perfecting it, as the printing-press. There is, I believe, no specimen of any of the great power presses in this exhibition, but there are several new forms of small power and hand presses which are fascinating in the celerity, smoothness, and accuracy of their performance. There is, I presume, no doubt that the world would be better off if half or three quarters of the printing presses could be destroyed, but our faith in this proposition need not make us insensible to the wonderful intelligence and skill which has brought this much abused instrument to its present perfection. The little type-casting machine hard-by is a worthy coadjutor to the presses. I believe all the machines for this purpose have been American inventions, and all, with perhaps a single exception, the work of a single man, David Bruce, of New York. We miss the type-setting machine, which ought to be here to complete the course of instruction.

The usual array of machinery, heavy and light, is brought together on the eastern half of the floor of the main building, and in the gallery over it. The sewing-machines carry the day as to number and variety, but in size and intricacy the great cassimere loom is the most imposing, doing the work of half a dozen hands with a quickness and regularity of which no human hands are capable, and yet under the easy control of a single woman. The power for all this machinery is furnished by a Brown engine of great beauty, and behind this again we find two great steam-boilers made by the Whittier Machine Co., and set with the remarkable Jarvis Patent Gas-Consuming Furnace, which appears to be a triumph over obstacles which have heretofore been considered insuperable. The advantages claimed for this furnace are, in brief, that by the admission of hot air to the interior of the furnace through a number of small ducts, the combustion is rendered much more perfect than by any other furnace, insomuch that not only are the gases consumed, but cheap and even wet fuel can be successfully used, such as undried peat, wet sawdust, coal screenings, wet brewery hops, green wood, and various other classes of otherwise impracticable fuel. On one or two days in the week the furnace is fed entirely with wet peat taken directly from meadows in Roxbury, and the usual fuel is anthracite screenings.

A variety of exhibits, more or less especially interesting to architects, are grouped around the entrance of the main hall. The Selenitic Cement Company shows samples of this cement, which seems to be growing in importance to the profession, but one is hardly helped to any judgment as to its qualities by what he sees of it here. The testimony of well-known architects and builders of England seems to be altogether in its favor as an excellent and economical material. Messrs. Wentworth & Co., and Bowker, Torrey & Co., present rather indifferent examples of marble mantels, and the usual collection of hand specimens of domestic and foreign marbles. The latter firm exhibit, in addition, some fine pieces of the red Bay of Fundy granite, and of the Calais granite, polished. Two or three of the prominent dealers in fancy wood exhibit beautiful collections of specimens, — notably Messrs. Palmer, Parker & Co., of Portland St., who show a most fascinating variety of native and foreign woods, not in small bits, but with fair broad surfaces of each, polished *à rasoir*, and arranged with great good taste. Among these woods are some which we rarely see, as the Cocobola, the Amboine, and the Spanish Cedar, and which glow with a sombre splendor of color. The potters are all brought together in this neighborhood, and their displays are, on the whole, promising for the future of this interesting and important manufacture among us. The New England Pottery Co., of East Boston, send a lot of common white china for table service, and chamber sets, mostly plain or very simply decorated, and in very unobjectionable forms, though with no attempt at elegance. Hews & Co., of North Cambridge, reproduce very successfully many of the classical forms in vessels and vases of many kinds, mostly in red clay, with figures in a creamy white. The Portland Stoneware Co. send a great variety of ware of all forms, colors, and uses, from a small match-box to a big garden vase, among which the plain white clay, undecorated and waiting for decoration, appears the best. The Boston Fire-Brick Company exhibit, besides their chief product, an assortment of terra-cotta work from Mr. Loring's works which is very good as far as it goes, but might easily, one would think, have been carried further. I saw nothing from the Chelsea or Beverly potteries.

The virtues of Portland cement are popularly illustrated by a workman who sits with a little pile of damp cement before him, and with a couple of small moulds and a tamper speedily turns out flower-pots and match-boxes of cement, ready for instant service. Messrs. Boorman & Co. had here at the outset of the fair an exhibit of fire-proofing blocks, tiles, etc., which was interesting and instructive to any visitor of a turn for building, but it was judged by the management to be "easiness to the general," and was sent to the cellar. It still has good company, however, and, if it meets fewer eyes than in its old position, will doubtless be seen and marked by those who will most appreciate its merits.

On the right of the main hall Mr. Seth W. Fuller has a very full and worthy collection of his various appliances in the way of bells, tubes, annunciators, etc., which is a striking example of the progress of the age in luxury and the power to provide the small conveniences which obviate trouble.

Of small inventions which make one smile by their simplicity and cleverness, there are perhaps less than the usual variety. The two which I specially remember are a contrivance for so hanging an ordinary pair of outside window-blinds that they may, in the twinkling of an eye, be closed, fastened together, unhinged at the bottom, and swung out from the top like an awning, — and a new form of window sash-holder and lock, consisting simply of a small iron rod behind the pulley-stile, on which slides a pierced disc, running free and holding the sash. When the sash is in motion the disc is held horizontal by the hand and slides easily on the rod; when the hand is removed the disc cants a little and binds, holding the sash immovable. The cost is trifling, and the device seems an admirable one. A third invention, which might come under the same head, is the machine for measuring leather. All leather, except sole leather, is sold not by weight but by the square foot, and as the shape of a skin is very irregular the measurement by the ordinary method is difficult. By this machine a frame holding a multitude of upright iron pins is lowered upon another frame, upon which is laid the skin to be measured. All the pins which are over the leather are stopped by it, while all the pins outside the leather drop through holes beneath them on to a platform just below, which forms part of a balance; a dial above registers the difference between the weight of the pins so dropped and the whole number of pins in the frame. This difference is of course the weight of the pins which are stopped by the leather. The weight of the pins is translated into area, sixty-four pins meaning one square foot superficial.

The furniture men all appear with liberal contributions, but their warerooms are very much more interesting. The space allowed to each is ridiculously small, and the bulky cabinets and bedsteads and sideboards are huddled together in a way that makes it impossible to see them to advantage. I remember nothing here that seems to invite special mention.

A.

LECTURE ON ARCHITECTURE. THE NEW THEATRE ORDINANCE.

CHICAGO, October 4.

LAST evening Mr. W. L. B. Jenney delivered the first lecture in his course before the Chicago Academy of Design, his subject being "The Savage Tribes and Egypt." Your representative entered the hall not without much curiosity to see how far the architectural fraternity, so largely represented in this city, might feel inclined to

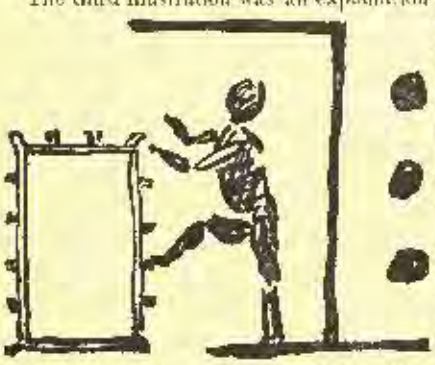
patronize and encourage the efforts of the management of the Academy to disseminate information on the subject. When the lecturer was announced a survey of the audience showed that not one architect was in the room. A sprinkling of eager and earnest young men indicated that perhaps they might be assistants or students. But the greater part of the audience consisted of ladies and gentlemen entirely without the pale of the profession, while the art students from other classes were very few indeed. In view of the fact that Mr. Jenney gives his services gratuitously to the Academy, the want of encouragement on the part of the profession most interested in the subject places it in a most ungraceful light. The secretary of the Academy took great pains to send full information of the scheme to all the architects and draughtsmen in the city. It is an experiment which needs substantial encouragement, and if the architects do not at least patronize it by buying course tickets for themselves and their assistants, it will be mainly their fault if it is not repeated or continued.

Mr. Jenney commenced with the statement that the art of architecture is the outgrowth of structural form. Its relation to engineering was clearly explained.

Illustrations were rapidly drawn on paper with charcoal and colored chalks. The first showed three plain arches supported on square piers. Taking this as a form of simple construction taken from the Roman type, he first rubbed out one pier and explained how the column was developed from the pier, with cap and base. Then the outer line of the arch was accented by a label moulding and the intersections decorated with carved bosses. Then the arches were moulded and decorated with dog-tooth and chevron ornamentation, showing how the construction was retained without change during all these decorative developments. Hence the justification of the statement that architecture is ornamented construction, the decoration being the accentuation of structural features, and worked in the constructive material.

He then gave a short sketch of the condition of man in primitive times, and how rationally the savage used constructive materials. The second illustration was a Malay hut, the style of which has continued to the present day. He then gave a description of the development of the earliest known stone architecture in Egypt, and a sketch of Egyptian history according to the latest Egyptologists. Speaking of the pyramids he said that it had been discovered that the step-shaped pyramids were the oldest, while the great pyramid of Saphis was a more recent structure, being the largest specimen of that kind which is distinguished by a smooth exterior facing.

The third illustration was an explanation of the nature of Egyptian hieroglyphics, and Mr. Jenney showed great skill in explaining the different kinds of writing on stone that had been used. Your readers may be interested in the following representation of a familiar word.



Of this his explanation was, "The hieroglyphic designating 'an architect' seems to represent him as having finished a plan of a temple, and to be kicking it out of his office. Over his head is a gallows, to hang him on in case the building should fall down, and on one side are three stones to be thrown at him in case the cost of the edifice should exceed the estimate."

The three classes of Egyptian buildings — pyramids, tombs, and temples — were then described in detail, and illustrations of each were drawn. The method of constructing a pyramid as described by Diodorus and Marriette was minutely described, with drawings made before the audience. In describing the rock-cut tombs Mr. Jenney made a drawing of a queen's head in colored chalks, describing as he proceeded the methods pursued by the Egyptian artists, in which drawing, stone-cutting, and painting were employed. The lecture concluded with a description of the great Temple of Karnac.

Altogether the lecture was a greater success than the audience, one of the Academy galleries being only moderately filled. Some excellent examples of life school work by the students are displayed on the walls.

The city council of Chicago passed a very important Theatre Ordinance on the 14th of June last. This is the result of the most persistent efforts of Building Superintendent Cleaveland, who has been working at the matter ever since the Brooklyn Theatre fire. Unfortunately our theatres are all built, and there will be but little to do under the law except to enforce the provisions which relate to the management of existing buildings. Two new theatres, The Academy of Music and Hamlin's, have been built this year, too early to be covered by the provisions of the law relating to new structures, and one, Haverley's, has been reconstructed to a large degree. But none of these conform to the requirements of the new ordinance. It remains to be seen now what the superintendent with the cooperation of Fire Marshal Bruner will be able to do in procuring its enforcement in existing buildings. W.

NEW BUILDINGS.

Saint John, N. B.

We have again reached the season when few new buildings are begun, and those in progress are hurried on so that they may be roofed in before the severe winter comes. During last winter, which was unusually mild, a considerable amount of building was done, but it is not expected the next will be like it.

The most important public work, the Custom House, is still undecided, more than a month having passed since the tenders were received at Ottawa. In the mean time the east wall is being built from the foundation to the level of the street, a height of about twenty-one feet, with large blocks of granite in courses from three to four feet in thickness, the wall extending 200 feet on Prince William Street. Mr. Mooney is carrying out this work. Another instance of delay on the part of the Government is the Savings Bank. This work was tendered for in May, and the contract has only recently been awarded to Mr. Geo. J. Grant in place of another contractor who had commenced the work.

The Provincial Government, finding that increased accommodation was needed for insane persons, is now enlarging the lunatic asylum at Fairville by adding a new wing. The plans have been prepared by Messrs. McKean and Fairweather, architects, who are also superintending the work. The addition is three stories high and covers a space of ground 106 feet by 58 feet. The design is made to harmonize with the old work and will be executed in the same materials, brick and stone.

The amount of money spent on churches speaks much for the religious zeal of the inhabitants of this city. Eleven of the old churches remain, and there are twelve new churches, some completed and others building, in all twenty-three, a large number in proportion to the population.

The Church of Saint James, by Messrs. Croff and Camp, cannot be looked upon as a successful adaptation of Gothic work, but the Centenary and Methodist churches, by Mr. Welch, have good detail. In both these buildings the walls are built of rubble work, the jambs, mullions, and tracery being formed of artificial stone. The Reformed Presbyterians are building a church by days'-work, instead of contracting with a builder in the usual way. The building, which is Gothic, is about 66 feet by 46 feet, and will accommodate about 400 worshippers; there is also a school-room for 300 children under the church. Brick with stone finish is the material employed. Mr. F. Kain has prepared the plans and is superintending the work.

In the recent competition for Trinity Church the design of Mr. Thomas, of Montreal, was accepted. His drawings illustrated a long, conventual-looking building with semicircular apse, the windows single, lancet form, long and narrow. It is hoped this design will be more satisfactory as regards cost than that prepared by Messrs. Potter and Robertson.

There is a probability that our local architects will once more meet in competition, but this time there are nominally three premiums offered, the first, as usual, being merged in the commission. In the month of June the Provincial Government advertised in the *Royal Gazette* that designs were required for new Parliament Buildings, notifying that on a certain date a plan of the site and particulars could be obtained, but the time has long since passed and expectant architects still wait for particulars. Conflicting rumors are afloat respecting the work, some to the effect that it will be abandoned.

Of important buildings in progress elsewhere the Exhibition Building at Fredericton and the Acadia College at Wolfville, N. S., may be mentioned. The latter building is of wood, and of Italian design. Messrs. Dumaresque and Wickenden are the architects.

From various sources of information I am inclined to think there is a lack of moderate-size dwelling houses in this city. The prevailing system of letting flats, with one entrance and the back yard in common to all the tenants, is not without its disadvantages; and although the houses built since the fire (for which architects have been employed) show better planning than the old ones, there is still room for further improvement. R. B.

THE BOULOGNE LIGHTHOUSES.

The projected new harbor of navigation and refuge at Boulogne promises to be one of the most splendid on any coast of France, notwithstanding some apparent paradoxes in the scheme of its construction. Its group of lighthouses, however, may be regarded as of even more general importance than the contemplated haven itself, because they will afford an infallible guide to the mariner exactly where he is most liable to mistake his way on the Channel waters. They are to be four in number, furnished with the most powerful lights, upon the best-known principles, and capable of casting a gleam at least of their radiance upon the opposite shore. No similar cluster, supposing this to be completed, exists in the world, the utmost hitherto attempted having been the establishment of two, generally at the extremities of an extended bay in which vessels were in the habit of taking shelter, or where the business of the sea was customarily carried on by night. But it by no means follows that the quartet of beacons at Boulogne will be without a parallel in point of number, different though the arrangement may be. There are no fewer than eleven illuminated signals of the first, second, and third

class, flashing their rays upon the river approaches of the Gironde. At first these were no more than iron baskets of burning coal or wood, suspended on lofty poles: then lamps were substituted, fed with coarse oil, and supplied with round or flat wicks; next, the inventions of Argand came into use, with Carcel following them, whose mechanisms, indeed, have not yet gone out of use, though greatly improved by the combinations of Arago and Fresnel, with whose names the history of the French lighthouse system will always be connected. The catoptric system, with which mirrors or reflectors were introduced, was an improvement, perhaps, though nearly parallel with the dioptric applied by Fresnel to his famous "tower" at Cordouan, almost in the very mouth of the Garonne. This was succeeded by a lighthouse at Mount Agria, on the Mediterranean coast, and another at Cape Beaun, visible to one another at a distance of more than seventy miles. At present, aided by peculiarities of apparatus, the lighthouses of the French coast are nearly all illuminated with colza oil, though the electric element is expected to displace it in lanterns of the first order, and at the greater height. Petroleum was used, in several instances, with no great success, as at St. Gaulsin. But it will be less with the kindling power than with the durability of the edifices constructed by them that the marine architects of Boulogne may be expected to principally concern themselves.

The loftiest structure of this class on the French coast, at present, is that of Cordouan, more than two hundred feet, or about the height of the towers of Notre Dame, and followed by those of Dunkirk, Calais, and Baleines, on the western extremity of the Isle of Ré. Originally, it was not much more than half its present height, which is calculated from the level of the highest possible tide. Among its singularities is that, while the exterior suggests the idea of a fortress, the interior recalls that of a palace, elaborately sculptured and adorned. Isolated in the midst of the waters, it has, nevertheless, far above them a vast platform, on which the habitations of the assistant keepers stand in comparative safety. Somewhat similar is the position of the great Pharos of Henri de Breteat, on the Brittany coast, reared upon a huge porphyry rock, formerly the sailors' terror, commenced in 1836 and completed in 1839, in defiance of extraordinary difficulties, occasioned by the violence of the tides acting upon a multitude of formidable shoals and reefs. It was here necessary, not merely to construct an edifice, but also to hew out or blast a little port among the rocks, where the craft employed by the constructors might lie in safety. As the slim though solid tower grew up, every course of masonry was, twice a day, covered by the waves, until a certain elevation had been reached; being thus bestrewn with slime and sea-weed, which, as will be well understood, were no facilities to the builder. Sixty workmen, however, under the direction of the engineers, performed their tasks so well that their platform has scarcely ever since needed a repair. They squared, grooved, and dovetailed every separate block, employing cement which, as they declared, and as it seemed, acquired in a few hours the durability of stone; but whatever the truth in that respect, the result has justified their confidence. Since that period, however, French lighthouse architects have unfortunately been content with foundations of less Roman solidity, and the lighthouses themselves have been constructed of less massive materials. In fact, the manufacture of these edifices in iron for trans-oceanic ports has become almost a distinct branch of French industry, and some of the perilous points on the French coast itself have been thus supplied, — as at Pontaillac, near Royan, which indicates an entrance, amid thick-set sandbanks, to the Gironde; and at Walde, which points out a dangerous stretch of the same obstructions, fronting the port of Calais, which, scarcely less than Boulogne, requires a new port, a new pier, and a new set of warnings to navigators.

It is interesting, however, to note, now that so much attention has been attracted by the Boulogne project, that about the middle of the seventeenth century there was near the existing jetty a lighthouse of Roman construction, reputed to have been erected by Caligula, when upon his expedition against the Gauls. Montfaucon affirms that it succumbed in 1644, in consequence of the cliffs below giving way, and he supplies the design of the building, which has every appearance of authenticity. The ground plan of this tower was octagonal, and the tower itself was composed of twelve stories, diminishing, like those of a Chinese pagoda, each by a step, as they rose one above another, and each also having a broad cornice, constituting a sort of gallery, like that of the more famous but kindred building at Alexandria. Each of the eight sides was twenty-five feet in width; but with reference to the height, concerning which no exact details remain, it is calculated that if the measurements of Montfaucon were estimated with any approach to accuracy, it must have approached to that of the structure at Cordouan, or slightly over two hundred feet. The walls were carried up in irregular courses, following, however, a systematic plan; to three layers of Boulogne greystone succeeded two layers of a stone softer in substance, and in color yellow; then two layers of immense dark red bricks, followed by the greystone, and so forth to the end. This lighthouse would appear to have been restored by Charlemagne, who rekindled the beacon-fires which his barbarian predecessors had permitted to die out; but after his epoch it was abandoned, in what particular period is not known. Curiously enough, however, as M. Reynaud points out in his exhaustive work, in quarto and folio, upon the whole subject, there have been discovered near Dover the remains of a tower, built apparently upon the same lines with that at Boulogne, evidently designed to answer the same purpose, and, moreover, so far as may be ascertained, belonging to the same period. The architects of Boulogne, therefore, may in some measure take unto themselves the credit of reviving a Roman work. The longevity of some among these structures has been remarkable, notwithstanding the furious weather to which their inevitable elevation and the very purposes they serve expose them. That of Genoa, lofty as it is, dates from early in the sixteenth century; and many others, still in use, are equally ancient. — *The Builder.*

THE OWNERSHIP OF DRAWINGS.

Newport, R. I.

To the Editor of the American Architect:

Dear Sir, — I have read with interest your remarks on the subject of the ownership of architects' drawings and judicial decisions bearing upon the same.

This subject was very fully discussed by the R. I. Chapter of the Institute in connection with the preparation of a form of contract. This form, which has since been adopted, contains the following clause: "10. All drawings, plans, and specifications shall be returned to the architect before final payment is made." This clause has been found to work advantageously, the contractor usually making his appearance at the completion of the work with a large roll of details, etc. I have never had a case where the owner claimed any portion of the drawings; but, if a clause similar to the above were inserted in all contracts, it would meet such claims on the part of owners as well as contractors; the contract being carefully read and understood by both parties before signing.

Very respectfully,

Geo. C. Mason, Jr.

BOW CHURCH.

For some time past this famous peal of bells, one of the finest, if not the finest, in the city of London, has been undergoing examination in the public interest, and before long the familiar chimes which captivated or consoled a Whittington, and have since charmed many more from time immemorial, will ring out as before.

The Church of St. Mary-le-Bow, which, if not originally a Roman temple, as generally believed, was one of the earliest churches built by our Norman conquerors, has been destroyed more than once by storm and fire. It was at one time garrisoned and besieged, and was afterward the scene of an assassination. It was first mentioned as a Christian church in the reign of William the Conqueror. Stow says it was the first in the city built on arches of stone, and that it was therefore called St. Mary de Arcubus, or the Bow, although he elsewhere says, but with less apparent probability, that it took its name from certain stone arches supporting a lantern on the top of the tower. The Court of Arches was formerly held in this church, and derived its name from that circumstance.

During the reign of William Rufus the roof of the church was blown off by the wind, and four of the rafters were driven into the ground with such violence that, although they were each twenty-six feet long, little more than four feet of their length was visible, the ground in the neighborhood being then a mere fen. About one hundred years after this event a tumult of a serious nature occurred in the city, which led to the assault upon the church before alluded to. The ringleader was William Fitz Osbert, surnamed Longbeard, who was almost worshipped by the lower orders on account of his exertions as a professed advocate of the poor against the oppressions of the rich. An attempt being made to seize him, he took refuge in Bow steeple, together with various followers, and, being well provided with ammunition and provisions, was able for a long time to defy the authorities. In order to drive him out, the steeple was fired. This had the desired effect; the rioters were made prisoners, and, after a hasty trial, were hanged at the Elms in Smithfield, at that time the usual place of execution. It appeared that Fitz Osbert did not lose his reputation among the people with his life, for it is said that after his death vast numbers of persons resorted to Smithfield, expecting that miracles would be performed, and that they carried away as holy relics pieces of the earth on which his blood had fallen. — *London Times.*

NEW PUBLICATIONS RECEIVED.

Industrial Science Drawing. Elements of Plane and Solid Free-Hand Geometrical Drawing, with Lettering, and some Elements of Geometrical Ornamental Design, including the Principles of Harmonic Angular Ratios, etc. For draughtsmen and artisans, and teachers and students of industrial and mechanical drawing. By S. Edward Warren, C. E. New York: John Wiley and Sons.

The Artisan. Illustrated by forty Plates of Geometrical Drawings, showing the most Practical Methods that may be applied to Works of Building and Other Constructions. By Robert Riddell, late teacher of the artisan class in the Philadelphia high school; author of "The Carpenter and Joiner," "Elements of Handrailing," "Mechanics' Geometry," "Lessons in Handrailing for Learners," etc., etc. Philadelphia: Claxton, Remsen, and Haffelfinger.

The Cambridge Boiler Explosion. An Examination of the Attack in the Columns of the *Boston Daily Advertiser* upon the Judi-

cial Decision. By J. R. Robinson. Boston: A. Williams and Company.

Illustrated Price List of Prison-Locks and Prison Equipments made by the Yale Lock Manufacturing Company, Stamford, Conn., and 58 Chambers Street, New York.

NOTES AND CLIPPINGS.

Loan Exhibition.—The Society of Decorative Art, New York, was to open its Loan Exhibition on Monday last. Among the paintings promised for the picture room are four magnificent works recently collected in Europe by Mr. J. H. Stebbins. One, by Alma Tadema, valued at $10,000, represents Queen Clotilde, wife of Clovis, first Christian King of France, instructing her children in arms. Another, by M. Gérome, pupil of Paul Delaroche, is a representation of Molière breakfasting with Louis XIV. at Versailles. Among the nobles present is Cardinal Mazarin, who, with clinched fist and scowling brow, expresses his anger with the young dramatist for daring to sit in the presence of the King. The owner values this painting at $18,000. A third picture is the portrait of a Spanish lady — the beautiful wife of the Spanish Secretary of Embassy at Rome — by Fortuny, valued at $10,000. The fourth is by M. W. Bouguereau, a pupil of Picot, and is entitled, "Hesitating between Love and Riches." Mr. Stebbins estimates its worth at $6,000. Some fine works by other foreign artists have been contributed by Mr. John Wolf, Mr. Marshall O. Roberts, Mr. William H. Vanderbilt, and Judge Hilton, but the titles have not yet been announced by the Committee on Pictures. Mr. LaFarge has come from Boston to search the studios for the latest specimens of American art not heretofore publicly exhibited, and has been successful in obtaining some fine paintings. The ladies of the society have accepted the offer of the Fifth Avenue Band to furnish music, and also those of the florists who illuminated their readiness to embellish the rooms with rare exotics.

The Injuries of Gas.—Some London warehousemen having returned goods to the manufacturers because the colors had faded, an inquiry was made as to the cause by Dr. Wallace, of Glasgow. London store-rooms are usually lit by gas, and in many cases the goods are exposed to the products of gas combustion during the whole working day. The cause of the fading is found in the action of the sulphurous acid, many of the pieces of the cotton goods returned having absorbed that substance in notable quantity, while in some the fibre itself was actually destroyed. Dr. Wallace suggests, first of all, thorough ventilation, to remove the fumes of the gas; and, secondly, the use of lime-white on the walls and ceilings, renewed frequently enough to enable the acid vapor to find lime with which to combine.

Mediæval Architecture in Cyprus.—During the reign of the Lusignans at Cyprus, Nikosia, the royal residence, contained many monasteries and about three hundred Greek and Latin churches. Of these only ruins remain, but the ruins attest the splendor the churches once possessed. The Gothic towers have been torn down, their mere stumps left standing, and the tracery of the window over the recessed doorway has been rent away in patches. Alongside the broken stump of each tower rises the incongruity of a Moslem minaret, built with the decorated hewn stone of the towers. The slab on which once rested the effigy of a Christian knight, the inscription yet visible on its side, has been prostituted to form a threshold. Another ancient Christian church is now occupied by the Turks as a granary. One little church used by the Armenians has escaped desecration. Every flagstone of the floor is the tombstone of a Christian. On most of the stones are graven full-length portraits of those who lie beneath them. The knights wear long, bushy hair and full, short bluff beards; they are clad in armor, and wear spurs on their heels. The ladies, whose faces are for the most part broad and short, of the Italian type, have the hair tightly braided under close-fitting caps, whence descend long veils that envrap the body to the feet.

A Gas Clock.—There is a clock in the Guildhall Museum, London, of which the motive power is hydrogen gas, generated by the action of diluted sulphuric acid on a ball of zinc. The clock itself resembles a large colored glass cylinder without any cover, and about half full of sulphuric acid. Floating on the top of this acid is a glass bell, and the gas generated forces forward this concave receiver until it nearly reaches the top of the cylinder, when, by the action of a delicate lever, two valves become simultaneously opened. One of these allows the gas to escape, thereby causing the receiver to descend, and the other permits a fresh ball of zinc to fall into the acid. The same operation is repeated as long as the materials for making the gas are supplied, and this is effected without winding or manipulation of any kind. The dial plate is fixed to the front of the cylinder, and communicates by wheels, etc., with a small glass perpendicular shaft, which rises with the receiver and sets the wheels in motion.

Longevity of Artists.—Artists as a class are remarkable for longevity; a list comprising 1,122 artists was made some years ago, which gave the following results: Died under sixty years old, 474; sixty years and under seventy, 250; seventy years and under eighty, 243; eighty years and under ninety, 134; ninety years and under one hundred, 19; and above one hundred, 1,—the mean age at death of the whole number being fifty-five years; from which some infer that the pursuit of fine arts has a tranquillizing effect upon the spirits and a tendency to moral refinement in the habits and manners of its professors, extremely favorable to longevity.

Willows and Railroad Embankments.—On one of the Prussian railroads willows have been grown with advantage on the slopes of excavations and embankments. It is surprising that a similar method of beautifying and strengthening the roadways of railroads is not more generally adopted. A perfect network is formed by the roots, binding the whole surface firmly, and preventing washouts; and the thick green growth covers ugly gashes in the earth, and unsightly elevations, with an agreeable, eye-relieving thicket. Almost any of the varieties of willow can be used with success, but that which is recommended as the best is the *Salix amygdalina*. In dry soil the cuttings should have a good length underground.

Hydraulic Salt-Mining in Bavaria.—A correspondent of the *World* describes at great length the process of salt-mining in use at Berchtesgaden, Bavaria. At this place the salt does not occur in deep rocky strata, as at the Polish mine at Wieliczka, but in a thick layer of saliferous earth in the heart of a mountain. The mine is entered by horizontal shafts, and the salt ingeniously removed by the solvent action of water working upward. At the end of each shaft a chamber is mined, and when it is large enough the entrance is dammed up and the chamber filled with fresh water through an opening at the top. The water is to dissolve out the salt from the roof of the chamber; hence it is necessary that the chamber be kept entirely full. At first, the water acts also upon the bottom and sides of the chamber, but soon there is left a pasty water-proof covering of clay, which prevents further action. At the top, however, the overlying earth falls away as a fine sediment as fast as the salt is dissolved, leaving always a fresh surface for the water to act upon. The falling sediment forms, under pressure, a water-tight floor to the chamber, which rises as the solution of the roof goes on, so that the chamber slowly climbs from the bottom to the top of the salt-yielding stratum. The solution has to go on with the utmost quiet, and not too rapidly, or else fragments of the roof will fall to the bottom, where the water is saturated with salt, and be lost. To keep the water constantly pressing against the roof, a proper supply of fresh water is continually added from above. Complete saturation of the water is effected in about three weeks, when it is pumped out and carried in pipes to Reichenhall, twenty miles distant, for evaporation. Fresh water is then pumped into the chamber, and the process repeated until the upper limit of the salt deposit is reached. In this way the mountain is being slowly washed, and its saline treasure stolen away, without removing the clay with which it was associated. The saliferous earth removed in tunnelling is refined in the usual way.

Indian Mound at Fort Leavenworth.—Major F. G. Adams, Secretary of the State Historical Society, was in the city on Thursday, and in company with Dr. R. J. Brown visited Fort Leavenworth and found six mounds on Sheridan's Drive, a short distance west of the post, one of which was 14 feet high, with a diameter of from 12 to 15 feet. After the discovery was made the gentlemen called on Dr. Fryer, and secured assistance in making the excavations. Yesterday Major Adams, R. N. Hershfield, C. A. Peaper, Rev. W. N. Page, and Dr. R. J. Brown visited the mounds, in company with Dr. Fryer, having two men with picks and spades. They dug a hole four feet square in one of the mounds, and found it walled up with regularly laid stone, arched, the walls being about one foot thick. They also found two parallel walls about six feet in length. Appearances indicated that fire had been used, apparently for the purpose of cremation, but no bones were found. The mound was not, however, fully explored. Next week further examination will be made, and a force of men employed in the excavation. In 1880 a government surveyor named McCoy wrote a book, in which he stated that a number of mounds were in existence just west of Fort Leavenworth. This book accidentally found its way into the hands of Major Adams, and led to the exploration. The location of the mounds was so well described that no difficulty was experienced in finding them. The number was not specified in McCoy's report. Trees are growing around the mounds, but none upon them. These are the only Indian mounds ever discovered west of the Mississippi.—*Omaha Republican.*

Statue of the Emperor Valentinianus I.—The remnants of the bronze statue recently found in the bed of the Tiber at the Sisto Bridge have been placed in the small museum at the Palace of the Cæsars. They are a series of fragments of gilded bronze, the most part representing drapery. The feet, attached to the marble plinth, and shod in the sandals, are well executed. The arms, with the marks of sword and axe, have also a historical, but not much of an artistic attraction. The identification of the statue has been made, and Baron Visconti, the Papal archæologist, has published the facts in a note to the *Osservatore Romano*. The source of information is the inscription cut in a marble slab, which formed the pedestal of the statue. This indicates that the statue was erected by the Senate and the Roman people, in gratitude towards the Emperor Valentinianus I., praising him for the providential work which he, with his brother Valens, did for the advantage of the Eternal City. It is known that the bridge bore the name of Valentinianus, after having borne that of Probus, as the Regionaries record. It remained until the present without any historical record. Ammianus Marcellinus relates that the work of the bridge was concluded by Aurelius Symmachus, Prefect of Rome. This was supposed to refer to the Cestian Bridge. But the new inscription shows that the passage refers to the present Ponte Sisto. The date of the statue and the bridge is therefore between 364 and 365. This is the first result that follows from the discovery of the inscription. A second is that the statue, which was supposed to belong to the best period of Greco-Roman art, is only a specimen of art in its great decline, though some good qualities are still retained.—*The Pilot.*

The Gibraltar Tunnel.—The proposed tunnel between Spain and Africa is still before the public. This tunnel, according to the plan at present contemplated, is to extend from within a short distance of Algeciras, on the Spanish side, to between Tangier and Ceuta, on the African side. The length of the submarine tunnel will be nine miles, with an inclination of one foot per hundred, and the approaches will have an extent of six or seven miles. The greatest depth of the sea is 3,000 feet; and, as it is intended to have a thickness of some 300 feet of rock left between the roof of the tunnel and the sea bottom, the greatest depth of the tunnel will thus be 3,300 feet below the level of the sea.

A Coiner's Trick.—Professor B. Silliman mentions a curious case of debased coinage. A large number of spurious doubloons were uttered by one of the Peninsular governments during the late civil wars, the nucleus of which was a disk, or blank, of platinum, which was inclosed between faces of gold, the blow of the coining press concealing the fraud, while the weight of these spurious pieces was identical with the genuine coin; the value, however, of the platinum being about one third that of the gold coin it represented. These platinum blanks had been prepared by the Russian government for use in the suppressed coinage of that metal.

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CONTENTS.

SUMMARY: —
The Indiana State House Competition again. — Suit of a Competitor. — The Use of an Architect's Drawings. — The Chicago Theatre Law. — The Fall of the Forty-second Street Tunnel. — The Spinola Steam-heating Scheme. — The French Workman's Exhibition 137
AMERICAN ARCHITECTURE — WITH PRECEDENT AND WITHOUT . . 138
MODERN PLUMBING. IX. 140
THE ILLUSTRATIONS: —
The Church of St. Michael and all Angels, Baltimore, Md. — Cottages at Berkeley, Cal. — Church of St. Hilaire, Rouen, France 141
THE MURAL PAINTINGS AT ASSISI 141
CORRESPONDENCE: —
Letter from Boston 142
COMMUNICATION: —
Archæology and the Vernacular Architecture 143
THE CHICAGO THEATRE ORDINANCE 143
NOTES AND CLIPPINGS 144

WE are not yet, it seems, at the end of the quarrels over the Indiana State House competition. The latest phase of them is remarkable. Mr. E. E. Myers, one of the disappointed competitors, has entered a suit in the United States Circuit Court against the State House Commissioners for damages to the amount of forty-five thousand dollars, on account of their use of the plans submitted by him in the competitions. After alleging in his complaint that having been one of the four competitors in the original competition he submitted in the second a new design with complete and trustworthy plans, specifications, and estimates, the preparation of which cost him in actual expenses ten thousand dollars, and employed his own labor and professional skill to the value of thirty thousand dollars, and that they were returned to him so mutilated as to be worthless, Mr. Myers complains that the accepted plans, submitted by Mr. May, were imperfect and unsuitable, and that the building as designed by him would have been in danger of falling by its own weight, facts of which the commissioners were advised by the experts called in for the competition; that the specifications and estimates furnished with Mr. May's plans were imperfect, and insufficient to enable the experts to test the estimates, as required by the law; that the commissioners, knowing these plans, specifications, and estimates to be unsuitable, took advantage of their opportunities to have Mr. Myers' plans photographed, and to use them, with his specifications and estimates, to supply the deficiencies in Mr. May's in order that this plan might be adopted, and thereby converted them to their own use, for which reason he demands the amount of two and a half per cent on the estimated cost of the building, as usually allowed to architects for plans and specifications, or, as we have said, of forty-five thousand dollars.

IT is always a matter for regret that a losing competitor should feel called upon to publicly attack the plans of his successful rival, and in the present complaint the criticisms of Mr. May's plans are apposite only as they support the charge of the appropriation of Mr. Myers's plans by the Commission. We do not suppose that the choice of the Commissioners can at this day be overturned by any complaint that they have chosen a bad design. The charge, however, that they photographed Mr. Myers's plans and took advantage of suggestions in them to amend the accepted plans is a very serious one, and would, if it is proved, justify their dismissal. The mere photographing of unaccepted designs without permission is in itself an act of bad faith and a flagrant usurpation, which raises a presumption that it is done in order to make use of the plans without adopting them. It is a recognized rule, and has been confirmed by judicial decision, in Massachusetts at least, that whoever makes use of any feature or device borrowed from plans or designs submitted by an architect, is bound to pay him for the use of them, even though they be returned to him unaccepted. And we have no doubt that the court will in the present case decide that if the Commissioners have in this way used Mr. Myers's plans he is entitled to compensation either from them or from the State they represent. The photographing of his drawings, even if the photographs were not for architectural use but only, as the Commission is said to have unofficially declared, to be preserved as records for use in case of future dispute, also clearly entitles their author to a compensation, though it might be difficult to fix the amount of it by any established rule, no provision for such an infringement being provided in the usages of practice. Though this should be the only thing proved against the Commissioners, it is desirable that they should be brought to book, for the sake of future competitions and for the recognition of the principle that an architect's drawings are inviolable until he has distinctly assigned them for use. It is as much for the good of the public as of the profession, in the long run, that commissioners and committees should be taught not to take advantage of the architects whom they entice into competitions.

IT might be wished in the interest of the profession that the questions of drawings, and design or professional service, should be kept visibly distinct in such a case as this; for the public is too apt to regard the drawings as the whole measure of the service, if not actually to confound the two. If, for instance, the Commissioners took advantage of Mr. Myers's ideas, they are liable for the proper professional fee. If they simply spoiled his drawings, as he alleges they did also, this is a matter entirely distinct from the question of two and a half per cent, or whatever may be awarded him for appropriation of his design, and the payment should reasonably be the cost of reproducing them. It would be doing good missionary work to have the actual cost of a set of drawings for such a building made publicly known. A dozen years ago, when the competition for the new Law Courts in London was arranged, the English Government allowed to each of the twelve invited competitors about four thousand dollars (£800) as a return for his expenses, and it is said that they were all out of pocket. The drawings in this case were unusually elaborate, but no estimates were required, or at least none in detail. Mr. Myers claims that the actual cost to him of the plans, specifications, and estimates was ten thousand dollars. This looks very large, but we have no means of judging of its reasonableness. The amount of work demanded by the conditions of the competitions if thoroughly carried out was enormous, since they required the design to be practically ready for contract. The conditions were indeed so oppressive that, as we took occasion at the time to say, it was not creditable to an architect to enter the competition, a fact which diminishes the sympathy to be felt for those who entered and were disappointed. It did in truth demand, not the preliminary labor which is rated at one per cent of estimated cost, but the complete preparation for actual execution of work, for which the usual fee is two and a half per cent. It is not a bad thing to have the whole cost of such a competition proclaimed, and we could wish the public to take it home; but the architects who took part are shown to have had to face the alternative of rating their professional performances far below the accepted standard, or of risking many thousand dollars apiece in the most hazardous kind of lottery. We should not suppose that either horn of the dilemma would be an agreeable seat.

THE late disaster in the Colosseum Theatre at Liverpool gives point to the Chicago theatre ordinance, passed last summer, which we print in another column. Its provisions are an unquestionable improvement on the common habits in building and administering theatres. The requirements of a proscenium wall of brick, and the multiplication of exits, the arrangement of stairs, and the position of the auditorium are excellent, as far as they go. At the same time, to a proper regulation of theatres several more things are essential. No written description of requirements can make it sure that the exits of a theatre are what they ought to be; security in this respect will depend on the judgment and rigor with which the plans of the theatres are supervised by the inspectors of buildings. A brick proscenium-wall is a good and indeed indispensable thing; but it loses half its efficacy unless the arch and boxes of the proscenium and the adjoining ceiling of the auditorium are also made incombustible. The method proposed of "fire-proofing" floors invites a smile, though it is better than nothing: the covering of stud-partitions with iron lathing is only a palliative. The principal partitions, at least those that enclose the stairs and the corridors, ought to be of brick. We see no mention of a fire-proof curtain, a thing which has its value, although like other appliances kept only for extraordinary uses, it is too likely to be mishandled or out of order when it is needed. There is an impression, no doubt, that a large ventilator, or

vent, over the stage will make a fire-proof curtain unnecessary, but this impression we take to be more or less delusive, for, at least in cold weather, the draught in a theatre is constantly from the stage to the auditorium, and before it could be reversed irretrievable harm is likely to be done. The only assurance of value in the curtain, on the other hand, is in using it constantly whether it is needed or not, as is the habit in the French theatres. As for the limitation of the number of spectators, it would be an admirable provision, but it is not easy to believe it will be adequately enforced in an American city, any more than it is in American waters, where ferry-boats and excursion steamers are constantly loaded with four or five times as many passengers as their certificates allow them to carry, and where nobody is ever refused passage.

The vault of the Forty-second Street tunnel in New York, which killed two men in June last by falling in part, has given another warning. The vault, it may be remembered, was built in successive sections of seventy-five feet long, and it was directly after the centering of the second section was struck that this section fell. It was a vault of preposterous construction, being of very flat section, forty feet in span with but ten feet rise, — a brick shell of only six courses of headers, to be loaded at the crown with twenty-five or thirty feet of loose earth. Moreover, it was shown that the bricks were very carelessly laid, in mortar of no cohesion. Nevertheless an intelligent coroner's jury decided that the trouble was simply in loading the arch carelessly after it was built, and censured the contractor for this. The inquiry went no further, and since the first section of the vault did not fall, the second was rebuilt and the work went on as before, the inspector only ordering that the shell should thenceforth be built in seven courses of headers instead of six. Lately the first section, which had survived the earlier disaster, has been seen to be sinking at the crown, and on Sunday a large patch of it, about thirty-five feet across, fell down. Luckily no one was beneath this time, it is believed, the public having been warned off. The stone retaining wall on the face of the tunnel, where it emerges on First Avenue, is reported to be also in a dangerous condition. It is intended to support a bank of earth one hundred feet long and sixty feet high, yet is said to be only four feet thick at the base and two at the top, the latter being on the inside, and is built without even drain-holes to let out the water which may accumulate behind it. We shall probably not hear anything this time about uneven loading by the contractor: it is not easy to see how the responsibility can be again diverted from where it belongs, — in the office of the Commissioner of Public Works, where the work was designed and superintended. The people of New York are to be congratulated on this second accident. If their city improvements are at the mercy of an ignorance of construction and workmanship which would discredit a boy at an engineering school, it is a good thing to find it out as early and at as little cost as possible.

The New York Board of Aldermen has passed the ordinance in favor of the Spinola scheme for applying the Holly system of steam-heating to the city, without the restrictions that the more cautious of the board tried to fasten upon it. The experience of Lockport seems to show that the system deserves trial on a large scale, and there is no reason to doubt that it may be as practicable and useful as the common system of gas-supply. At the same time it is too serious an innovation to be tried in a city like New York except by the most trustworthy hands, and under the most careful safeguards. These do not seem to be the conditions of the present scheme. For this reason it is thought that the Mayor is likely to veto the ordinance, and again it is threatened that the Aldermen will carry it over his veto. One proposition, which has been pressed with some persistence — that the Spinola Company should be made to pay for its privilege, or the franchise be sold to the highest bidder — seems to us peculiarly ill judged, for two or three reasons. First, the only possible proper reason why a city should grant such a privilege, which involves a considerable sacrifice of general convenience, is that it will be for the benefit of the mass of its citizens. For a city to fall to speculating in attempts of such a kind would be altogether out of place and demoralizing. Second, the idea looks like a foolish economical juggle, for whatever is paid to the city in this way is simply so much added to the cost of the undertaking, which must in the long run be provided for by the tolls of the company; that is, it must come out of the pockets of the consumers, the citizens for whose benefit the franchise is conferred, and for whose sake the original payment was exacted. Finally, the imposition of such a tax gives the greatest possible inducement to save money by doing the work as cheaply and slightly as possible; whereas it is a thing which if done at all needs to be done in the most thorough manner. We should be glad to see the whole thing held in reserve till the question of subways under the streets has been duly considered and decided, because subways must doubtless in time come to be considered as necessities, and the wholesale undermining of the streets for a new series of conduits gives the best possible occasion for introducing them.

Outside the great exhibition of the Champ de Mars at Paris is a subsidiary one, of which newspaper correspondents do not say much, and of which probably not a great many persons who have stayed on this side the water this summer have heard at all, but which nevertheless is one of the most significant things to be seen there, not so much because of what is in it, as because of what it aims to be, and of the men whose work it is. It is the French workmen's exhibition. A plain building near the Porte Rapp, the main entrance of the principal exposition, contains the exhibits, which the workmen of the different unions, unassisted by their masters and employers, have got together, and the contributions of enterprising individuals. It displays a good share of the handiwork of various trades, with ornamented work of various kinds, and, what is more interesting, a large collection of inventions made by the workmen. It may be supposed that the amount of money at their command was not great; there is something a little pathetic and very admirable in the quiet perseverance with which they have carried out their purpose in the face of many difficulties, and have built up their modest display beside the great one. Their first application was for space in the great exhibition, which the government at that time, under the traditional dread of combinations of workingmen, refused to give. Under later and more liberal ministers the government relented, and granted them a space apart. The city of Paris allowed them fifty thousand francs, and the Department of the Seine twenty thousand, toward the expenses of the exhibition, which was opened by the Minister of Agriculture and Commerce in person. There was difficulty at first in the reluctance of many of the inventors, — who had not been able to bear the cost of taking out patents, — to exhibit their contrivances, lest they should give opportunity for pirating them; but the government again came to the rescue by issuing an order which protected all the inventions exhibited from imitation during the time of the exhibition and for three months after. It has been the habit to commiserate the oppressions of the French workingman, who is forbidden to combine in organizations and hold general assemblies, though allowed to meet in his local trades-union. Yet one cannot wonder if French legislators remember, that when the workingmen of France did unite and assemble, it was under the guidance of reckless leaders, to conspire against the peace of society, and that their means were blood and petroleum. How much is cause and effect, it would be dangerous to say, but that these French working men do more to bring honor on their calling than those of other nations, whose attention is swallowed up in agitation for class privileges and the remodelling of society, appears from a good many signs, among the most significant of which are their embassy to our Centennial, and this summer's exhibition at Paris.

AMERICAN ARCHITECTURE — WITH PRECEDENT AND WITHOUT.

A fortnight ago we spoke of the independence of archæology which is one characteristic of American architecture, — not without regret that, while our countrymen are by this independence delivered from many restraints, they have no equivalent for the wholesome discipline which a regard for precedent, and especially for style, can give them. These things call to mind the question asked not long ago by a correspondent who criticized somewhat incisively the drawings submitted in our competitions: "Whither are we tending?" and the question is answered independently and not inaptly by the general criticism of another person: "The tendency of American architecture is to the fantastic."

We may confess that this last saying is not more severe than is just, if we take into account the whole body of our architecture, the vernacular, the cultivated, and all the intermediate grades

together. Eliminating from the architecture all its imported characteristics, we shall have to acknowledge that in the American residuum there is a prevailing element to which the disagreeable title we have quoted fairly belongs. It varies in degree, being on the whole most prominent in the most purely native work, the least sophisticated by any foreign or other tradition, but cropping out as a tendency even among our architects of soundest training; occasionally we see it assert itself in the irrepressible *bizarreries* of Americans whose artistic nursing is wholly European. That it should be an American characteristic is, after all, not strange. It is the natural thing for a people restless, inventive, restrained by no artistic scruples or diffidence, fond of positive and even startling effects, and given to display. When there is put into the hands of such a people an unlimited supply of architectural forms from a great variety of unconnected sources, many of them originally striking, picturesque, or splendid, with no respect for authority, association, or original purpose to govern the use of them, the result can hardly be anything else than extravagant. If a company of simple persons, with no rules of dress to suit the occasion, were suddenly to break into the costume room of a theatre and fall to adorning themselves at their wills with all its finery, fantastic is probably the only word that would fit their attire. Something of this sort has befallen American architects. They have been let into the possession of a huge wardrobe of architectural properties, and while some of them have a fair knowledge of the traditions of the stage to guide their choice, and some a sense of natural fitness, a good many have nothing better than the whim of the moment, or the opportunity to take what they first lay hands on. The necessary result is all degrees of propriety and absurdity in attire, some being cleverly dressed, and others as grotesque as the savage who crowns his tattooed body with a stovepipe hat, or hangs a string of slippers about his neck. To make successful use of such unlimited opportunities is one of the most difficult things for an artist to do. For one person who can come out effectively attired from a miscellaneous wardrobe, there are a score who can dress with credit by a prevailing fashion. The power of putting into satisfactory combinations forms which belong together, and with which one is thoroughly familiar, is reasonably easy to acquire; the power to seize unfamiliar and unrelated forms and constrain them into an artistic union is one of the most unusual, and one of the last that a man comes by. As a nation deliberately eclectic and without much training, we have set ourselves artistically a pretty hard task.

The American architect then, where he differs in his ways from his European brother, has attacked his work at the most difficult point. A generation or two ago he designed securely by the well-understood traditions of an old style, and produced work which was at least sober, comely, well-bred, and never offensive. Then the echoes of the English revival came to his ear; the loosing of the old bonds followed, with the stimulus of a great array of new examples, and without the restraining grace of archæological reverence; Mr. Downing sounded his trumpet call, and henceforth repose was impossible and discipline distasteful; then came the "French roof" and the jig-saw, and the vernacular architect was emancipated. The result was naturally a series of extraordinary experiments. For the average American is as sure of what he likes and as self-reliant in matters of art as in politics or business. He has before him no remains of a better period — at least none of a period which he will acknowledge as better — to convict his work of inferiority; no consecrated standard by which to estimate it; no respect for any authority which tells him it is not the best. He thinks to conquer art as he conquers material progress, forgetting that all the enterprise that ever drove railroads through a mountain or built up cities in a year will not in itself attain it. Such being the character of his constituency, reflected more or less in himself, and his opportunities so unlimited, it is not wonderful that the architect's performances should be too often fantastic. What wonder if he presses into his service whatever takes his fancy; if his works are a combination of odds and ends picked up here and there because of their conspicuousness, his buildings bristling all over with turrets and dormers and gables and pediments and buttresses; if artistic quiet is impossible to him, and his most modest cottage contains architecture enough for a castle?

For all this it has been a habit, and people still continue it, to call upon us for originality, and to clamor for a new invention, a distinctively American kind of architecture. People of abstract tendency have demanded the expression of American ideas and characteristics in it; more positive people have offered samples of decorative material out of which it should be made, — eagles and striped shields, stars, stalks and ears of Indian corn; and a few architects have, with patriotic fervor, addressed themselves to carry out these recommendations. But here occurs the question, what kind of originality and what kind of expressiveness are required in American architecture? If originality means simply that American buildings shall be recognizably unlike other buildings, we have enough of it and to spare. There is nothing anywhere else in the world that is much like the vernacular French-roofed villa, or our ordinary builder's country house; if we consider our more pretentious city architecture or our public buildings, though they contain ideas gathered from all sources, there is not a city in Europe where the most of them would not look conspicuously foreign. As for expression of character, if we consider the qualities which persons who do not love us are apt to dwell upon, — vainglory, ostentation, restlessness, irreverence, haste, commercial unsoundness, and a general want of substance, — are they not written on the fronts of a million of our buildings? and the qualities which friendlier critics ascribe to us, — enterprise, invention, energy, independence, progressiveness, — are they not also everywhere displayed in our work? If, on the other hand, we look for the artistic qualities of a good style in building, harmony of parts, and the predominance of leading architectural ideas, for a distinct body of forms, individual and thoroughly adjusted to each other and to these leading ideas, assigned each to its definite place in a harmonious system; this is demanding what is not to be invented in a day or in a generation, and what really never has been reached by a predetermined effort.

What is needed is not patriotic inspiration, not eagles or maize, not originality, but agreement and skill. If we were given to-morrow a thousand new elements of form and decoration we should be no better off; we have already a thousand more than we know what to do with. How we are to be made to confine ourselves to a number of forms small enough to be worked into a coherent style no man knows. If this ever occurs it will be by natural selection, not by force of preaching or of votes. As for skill, the most rapid way of securing it is to work as we have seen others work, until we acquire it. Skill comes by discipline, and discipline is maintained by precedent. Originality and the development of style, in architecture at least, have never sprung from anything but adaptation to new wants; the condition of their success is skill. When a people has new and well defined wants to dictate the form of its buildings and new materials to encourage the development of a peculiar treatment, it has all the outward circumstances which any people ever had to incite it to create an architecture. So far as there is anything of real interest in the novelties of American architecture it has come by mere provision for practical needs or mechanical convenience, and this has been the way of all worthy architectural progress. The wooden architecture of our houses, slight as they are; their plans, which have developed distinct types both for city and country unknown elsewhere; our manner of using iron in architectural construction, — these are examples.

It is safe to say that as a rule the men who have been most successful in originality have been those who have been most studious of precedent and most rigorously trained, because thus they have gained the sureness of hand which has saved them both from timidity and from disaster when they were at their own guidance. This is true in a greater degree of nations. The architects who in this century have shown the most original power are unquestionably the most systematic, the most academic in training, — the French. It is because they have acquired their power by the best means of discipline the world now affords architects, and the discipline is of the most formal, being based entirely on study of the antique. It is particularly noticeable that they have been bolder, more characteristic and straightforward, less conventional, and more successful artistically than any others in the handling of the untried material, — iron. The unconventional American has thus far found nothing better to do with his iron than to work it into clumsy and shamefaced imitations of stone and wood. The Frenchman, slave of his schools and his precedents, develops it into forms unseen before and clearly expressive of its exceptional qualities. In like manner, it is not the engineer or the mechanic, when he undertakes to add decoration to his work, untrammelled as he is by artistic prejudice, who shows most originality or straightforwardness in ornamental treatment, to say nothing of other excellences. It is the well trained designer; and this because he

only has acquired by discipline the artistic sense of fitness which can show him the incongruity of old forms in new materials and teach him to modify or replace them for new conditions. We can see no reason, then, why Americans should feel concern about originality. It is one of the qualities which always disappoint a direct pursuit. From a disciplined hand it comes without direct effort, if it comes at all: from the undisciplined it is too likely to mean only the fantastic.

MODERN PLUMBING. IX.

SLOP SINKS — KITCHEN SINKS — WASH-TRAYS.

Slop sinks are simply small and deep iron or porcelain sinks, with a cold-water supply only. They save the water-closets from a great deal of rough usage and unnecessary foulness, and their water supply is of service for filling pitchers. The best shape is that which allows the waste to run off most quickly and exposes least moistened surface, but the sink should be large enough to allow water to be drawn for filling pails and pitchers without danger of the drippings falling on the floor. A very good, though rather expensive pattern is the Jennings Housemaid's Sink, which consists of a slate sink with a porcelain hopper and trap set in at the lower end. Over this hopper is a grooved cover, which can be turned up to allow a pail to be emptied directly into the hopper, and when let down serves as a draining shelf for setting things waiting to be washed at the other end of the sink.

Sometimes a porcelain hopper alone is used, like that of a water-closet, and supplied in a similar manner through a side arm. A strainer is formed in the porcelain at the bottom, and the hopper is set into a three-inch waste-pipe with trap. Some of the iron slop sinks, as Merry's patent, made by the J. L. Mott Iron Works, New York, and several similar forms, have an open hopper in the middle, with a four-inch outlet. These carry off a large quantity of water with great rapidity, and are very useful where a considerable amount of liquid is to be disposed of.

The slop sink waste soon becomes very offensive, and the trap should be placed close under the sink, to reduce as far as possible the exposed pipe surface between it and the sink. A ventilated S-trap is the cleanest, but the ventilating pipe must be as large as possible, even to the whole calibre of the trap, and the waste-pipe beyond the trap must not run more than two or three feet before entering the larger vertical soil-pipe, or siphonage will constantly take place, from the large quantity of liquid thrown down at once, and the rapidity of the discharge. Where there must be a considerable length of nearly horizontal pipe beyond the trap, even a ventilating pipe cannot be relied upon to prevent siphonage, and a reservoir trap must be used. This should be selected so as to be proof against siphonage under any circumstances, and to contain as small a quantity of liquid as is compatible with this requirement, and there should be no sharp edges or reëntering angles to collect deposit. Perhaps the Bower patent comes the nearest to fulfilling these conditions.

Of kitchen sinks there are many varieties: wood, either plain or lined with lead or copper, iron — plain, galvanized or enamelled — soapstone and slate are used.

Plain wood, if well made, constantly used, and kept clean, makes a tolerable sink. Two-inch pine planks should be used, either tongued and grooved, or with both edges grooved and a hard wood tongue inserted, and the joint should be painted with white lead and oil, and rubbed together. A bell trap with brass strainer is generally screwed in over the waste pipe. Unless kept constantly moist, however, the woodwork shrinks away from the joints, and a good iron sink is quite as cheap and much to be preferred.

The principal difference between the various makes of iron sinks is in the arrangement of the strainer and trap. The old-fashioned sinks, and many new ones, have a bell-trap attached to them. This is not the best arrangement, but as it is cheap and very common, it may be well to notice some of the different kinds. The worst is that which has the inverted cup attached to the under side of the strainer, and the strainer either altogether removable, which is the usual way, hinged at one side, so that on raising it to remove the obstructions which rapidly accumulate under the edges of the bell, or for the purpose of putting down solid refuse, the mouth of the waste pipe is exposed, and the air of the room is quickly contaminated with gas from the cesspool or sewer. The majority of kitchens are never free from the smell of the drains, principally for this reason.

The Magee Furnace Company, of Boston, make a sink which has a bell immovably fixed over the waste-pipe mouth, and a separate strainer, hinged, so that it can be turned back and the edges of the bell cleared without breaking the water seal. This is an improvement on the common form, and it has the additional advantage that apple cores and such rubbish cannot possibly be put down the pipe.

Another good feature is found in the sinks made by the Miller Iron Company, Providence, R. I., which have the bell attached to the strainer, but this is screwed down, and the bell, which has small projections cast on it, can be turned round by a thumb-piece above the strainer, and the projections scrape up the deposit around the edges of the bell, so that it can be washed down the pipe.

A more elaborate affair is Carson's Kitchen Sink, made by J. M. Carson, Louisville, Kentucky. This has a removable strainer and bell-trap of considerable size in the middle of the sink, but the bell-trap, instead of connecting directly with the waste-pipe, opens into an iron cistern, holding some ten or twelve gallons, the only outlet from which is through a pipe entering near the top, and turned down nearly to the bottom of the cistern, thus forming a very deep water-sealed trap. Unless sufficient water should suddenly be thrown down to fill the bore of the discharge pipe and convert it into a siphon, the water in the cistern will stand always at the level of the top of the pipe, and the grease which passes through the strainer will collect at the surface, and can be readily removed from time to time by lifting out the strainer and bell trap which serve as a cover. This device has good points: the waste grease is prevented from getting into and choking the drains, and is of some value for soap-making, and the deep-water trap in the cistern shuts off gas from the sewer; but the cistern itself forms a small cesspool which in hot weather, or when not much used, may get very offensive, and will make itself an unpleasant occupant of the kitchen, in spite of the bell-trap in the cover; and the clearing out of the grease, especially after long neglect, is a most unsavory operation.

The grease-collecting reservoir is, however, a very useful, appendage to a kitchen sink, and can be used without offence by placing it out of doors, as near the sink as possible, so that the grease will not congeal on the sides of the waste-pipes, burying it in the ground below frost, with a removable cover for cleaning out. Field's flush tank answers this purpose very well, independently of its other special merits. The common form consists of a small tight cesspool, just outside the house wall, of brick laid in cement, and with a stone cover. The outlet pipe turns down inside the reservoir nearly to the bottom, so that the surface of the water is always above the mouth of the outlet pipe, and the floating grease can solidify without obstructing the pipe.

Instead of the sink with bell-trap, the best plumbers prefer a plain iron or soapstone sink with only a strainer screwed in, and a coupling for the waste-pipe, and with a separate trap at a little distance below the sink. An S-trap will keep itself clean, though very liable to siphonage even when ventilated, but the grease which passes through it in a melted state congeals in the drain beyond and soon closes it. A grease trap outside the wall will prevent this, and should always be used in hotels or with large families, but with small establishments and careful housekeeping it is sufficient to use a large round-trap in place of an S-trap, furnished with a trap-screw of sufficient size to admit the hand for occasional cleaning out. A six-inch round-trap with a four-inch brass trap-screw will answer in most cases. The round-trap should have a ventilating pipe, for the accumulation of grease may reduce the waterway so much as to cause it to siphon out, like an S-trap.

Iron sinks without bell-traps may be had plain, galvanized, or enamelled. The enamelling looks much the best, but it is liable to crack off in time from the sudden expansion caused by hot water, assisted by blows from hard substances dropped into the sink, and it trebles the cost of the sink. Galvanizing is less expensive, but not durable. The plain iron costs about half as much as the galvanized, and a little black paint outside and soap and sand inside will keep it in pretty good condition until the iron wears out.

Soapstone, which is frequently used in the best houses, makes a strong and durable sink. It soon becomes black with the soap and grease, but the discoloration is superficial, and can be easily removed by rubbing with a flat stone and a little sharp sand.

When it is desirable to set a sink for occasional light use, wood lined with lead or copper serves a good purpose. Lead is now much less used than formerly, tinned copper having superseded it for this and similar purposes.

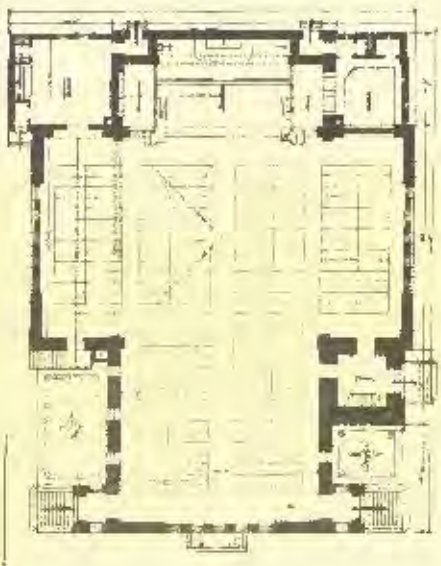
The supply to sinks is generally through ½ inch or ¾ inch cocks, according to the pressure. Either compression cocks or the Fuller patent are much more durable than ground faucets, under the rough usage to which they are exposed.

It is a common but unwholesome practice to enclose the space below kitchen sinks with boards to form a cupboard. The air of such a place is constantly saturated with moisture from the wet cloths and brushes which are thrown in, and the dampness rusts the metal of iron sinks, and condensing on the cold water-pipes runs down and keeps the floor wet, while the warmth of the hot water and waste-pipes adds to the general steam, and attracts swarms of water-bugs and cockroaches. The cupboard, if one is needed, should be placed where it can be kept well aired and dry, and the sink should stand free, supported either on a wooden frame with four legs, or on brackets, or it may be held at the back by a cleat fastened to the wall, and in front by two iron legs which fit into places cast for them on the sink. The round trap may stand on the floor under the sink.

Some patterns, as the McKenzie and the Demarest, have the legs hollow, one of them serving as a waste pipe, but this, although neat in appearance, makes it necessary to put the trap below the floor, or to use a bell-trap in the sink, either of which is objectionable.

In general, all plumbing work in kitchens should be entirely exposed, so that the fetid moisture which collects upon the pipes cannot run down behind plastering or sheathing and soak the woodwork into rottenness.

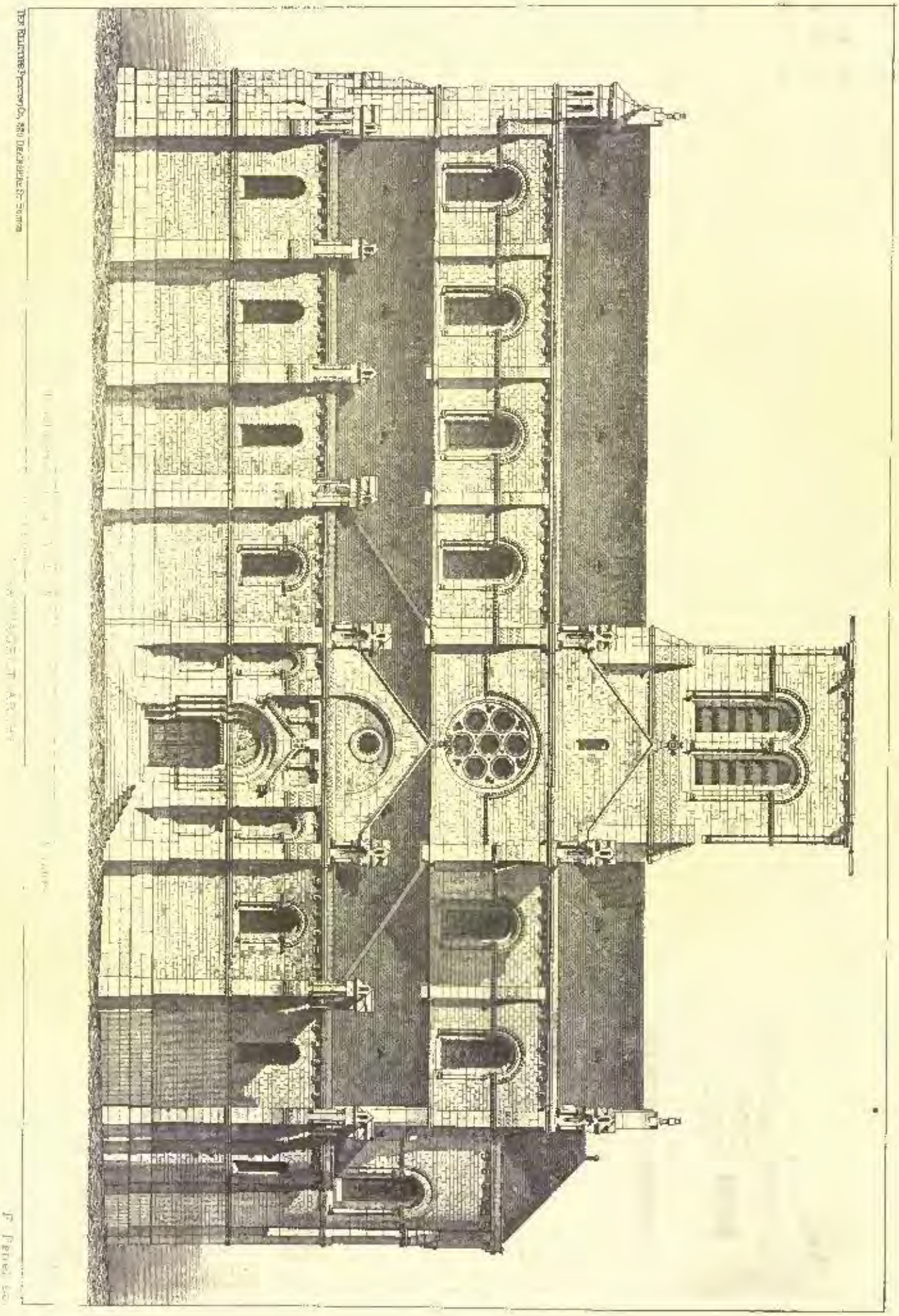
Wash-trays are usually made of soapstone. Wood will not long resist the alternate soaking and drying to which they are subject. The common arrangement is to make them in sets of three, two for the washing, and the third for the final rinsing, or sometimes one for



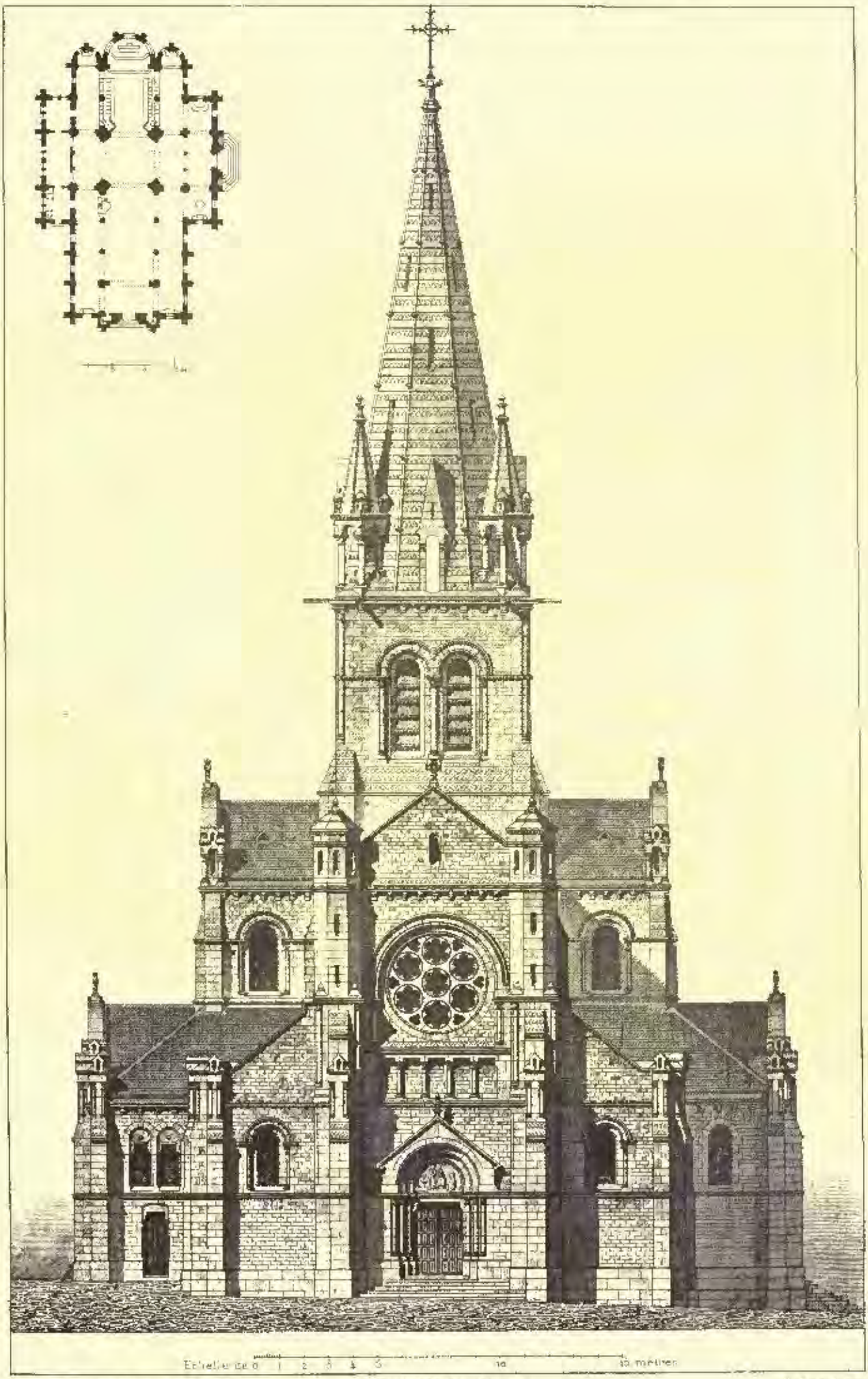
CHURCH OF ST MICHAEL AND ALL ANGELS — BALTIMORE MARYLAND

WYATT AND SPERRY ARCH'TS
BALTIMORE

THE HELIOTYPE PRINTING CO. 239 DEVONSHIRE ST. BOSTON



CHEVET OF St HILAIRE AT ROUEN



L. SAUVAGEOT, ARCHT

CHURCH OF SAINT-HILAIRE, AT ROUEN

MEEKER & BANKS ARCHITECTS. | COTTAGE FOR R.W. POINDEXTER ESQ. BERKELEY. CAL. | — SAN FRANCISCO, CAL. —

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the coarse washing, the second for finer articles, and the third for rinsing; but sets of two can be had. Exacting housekeepers, however, demand four. They are supported on a wooden frame, which should be open beneath.

Iron wash-trays can be had, either galvanized or enamelled, for about the same price as the soapstone, but are not much used.

The plumbing required is very simple, consisting of a line of hot and of cold water pipe, each with a cock over each tray. Compression or Fuller cocks are best adapted to the rough usage they are likely to receive. A strainer and plug, with coupling for waste pipe, is fixed in the bottom of each tray, and one trap serves for the whole set.

An S-trap, even if ventilated, can hardly be depended on to retain its seal against the strong siphon action caused by the large quantity of water discharged, and a reservoir trap is better. A six-inch round trap, with a four-inch trap-screw, is as good as any, and has the advantage that all the three waste-pipes, and even a fourth, can be entered beneath the water level.

The plug is generally put in loose, without any chain, which would be in the way of the washing. If a chain is thought necessary, it should be silver-plated, as either brass or nickel will stain white clothes.

It is very common and convenient to supply the wash-boiler, or caldron of tinned copper in which the clothes are boiled, with cold water only, and to carry a waste-pipe to the trap of the wash-trays or some other connection. This waste-pipe should have a cock outside the boiler, as a plug inside would be very inconvenient in use.

THE ILLUSTRATIONS.

CHURCH OF ST. MICHAEL AND ALL ANGELS, BALTIMORE, MD. MESSRS. WYATT AND SPERRY, ARCHITECTS.

THE transepts and tower of this church are now being built, on the northeast corner of St. Paul and Dornead streets, Baltimore. The exterior walls will be of Falls blue stone with finish of a reddish brown stone from Longmeadow. The interior will be finished with open timber roof, the walls will be decorated with painting. The arches and band courses will be of colored brick and terra-cotta, with corbels, etc., of Amherst stone.

COTTAGES FOR R. W. POINDEXTER, ESQ., AND C. K. CLARK, ESQ., BERKELEY, CAL. MESSRS. MEEKER AND BANKS, ARCHITECTS, SAN FRANCISCO, CAL.

CHURCH OF ST. HILAIRE AT ROUEN, FRANCE. M. L. SAUVAGEOT, ARCHITECT.

This church, of which we copy the two elevations from the *Encyclopédie d'Architecture*, received the first prize at the great exhibition of this year.

THE MURAL PAINTINGS AT ASSISI.

[*From The Academy.*]

THE unhappy alterations made to the Upper Church of St. Francis at Assisi are calculated to confirm the views of those who are conscientiously opposed to the new regulations, which place ecclesiastical edifices and the mural paintings and other works of art which they contain under the supervision of the civil power. It is manifest that a change in their custody was necessary, and that no government worthy of the name could stand by and witness the dilapidation which has been the rule without an effort to arrest it. The undertaking is surrounded with difficulties. There is the opposition of the clergy, weakened, however, by the fact that they have long been more destructive than conservative. Under such guardianship the frescoes of the Sixtine have been ruined, as well as the mural paintings in the Upper Church of St. Francis, and in numerous churches and chapels. Many wall paintings by masters of eminence have been whitewashed over; innumerable painted windows have been broken to fragments; pictures, illuminated MSS., and other precious objects have been secretly sold. The laity have been as much to blame as the clergy, with the exception of a few devoted friends of art; but the majority are indifferent, or fond of the tawdry church frippery and illuminations, which have inflicted irreparable injury on the finest frescoes. These vulgar trappings are now preferred to the noble and decorous ornaments and instructive illustrations of the great masters of art. Popular religious sentiment is gratified by attaching coronets, ear-rings, necklaces, and other jewels to pictures and statues, and would affix these to the "Madonna di San Sisto" or "di Foligno" if there was a chance of doing so. Customs older than Christianity itself, which have survived all changes, and which have been long encouraged, are not easily eradicated.

The Italian Government has removed valuable altar pieces from churches, and has replaced them with good copies, which are regarded with just as much reverence, and do quite as well as backgrounds for candles and artificial flowers. Some may think such removals irreverent, but government has not acted without precedent of the highest order—not only that of its predecessors, who could be accused neither of liberalism nor of irreligion, yet who did not hesitate to save precious pictures in churches from the sacristan and the populace by transferring them to places of safety, where the only worship would be that of the lover of art; but also that of the Vatican itself, which gathered into its famous gallery and so saved the "Transfiguration," by Raffael; the "Madonna di Foligno," by the same immortal artist; the "Communion of St. Jerome," by Domenichino, as well as other invaluable altar paintings. Frescoes, unhappily, it has been impossible to rescue except by an interference, which till now has apparently been thought out of the question; but with more courage the present government has resolved to preserve the fragments of interesting works, which but for ignorance and neglect might have been transmitted to the present time in good condition. An attempt is now in progress at Assisi to prevent the final disappearance of the greatest works of painting produced in the thirteenth century, which are not only invaluable in their connection with the history of art, but which possess merits of a high order. To know how really great an artist Giovanni Cimabue was, it is necessary to study the remains of his work at Assisi. Some have questioned his presence there. If they were right, then there was another great artist, his equal in all respects, whose name and history are forgotten. Since my late examination of the Church of St. Francis it occurs to me forcibly that the architect built it without reference to the painted decorations. These, I am persuaded, were an afterthought, with the exception of those on the vaults. He finished the wall internally with regularly-coursed fine masonry, which he would not have done had he known that it was to be plastered for painting; and the projections of the mouldings and string courses are fixed without reference to subsequent plastering. The mural painters were, therefore, under the necessity of limiting the *intonaco* to be painted upon to little more than one-eighth of an inch, that they might not bury the mouldings or injure the proportions of the piers.

The church exhibits peculiarities of construction of great interest. It has been made an objection to mediæval architecture that above the stone or brick vaulted coverings of nave and aisles there are wooden roofs. This building suggests in its structure that this fault, if it be one, might be got rid of, for above the groined vaults rise roof principals of brick, which support purlins and rafters of wood, but so mighty are they in strength that the thought occurs, might not the entire roof have been of the same material? The thrust, not only of the vaults, but of these prodigious arches, is such that it could be met by no ordinary abutments; and, instead of buttresses of the usual form, circular towers flank the walls, which answer their purpose but are deficient in architectural beauty. The roof was tiled in the usual manner; but the monks in charge allowed it to get into complete disrepair, so that the heavy rain passed through it freely, and, the conduits below being in a state of ruin, the water must have lain in pools in the hollows between the groined vaults, soaking the painted walls and detaching the *intonaco*, while a growth of black fungi on the humid surfaces of the pictures added to the general destruction. In the walls thus recklessly exposed for ages to the action of damp the lime has been reduced to powder; the sand with which it was mixed, therefore, presumably contained earthy matter. Lime and sand of quartz is insoluble, and it may be remarked that such a mixture is the only safe one for fresco painting. At Assisi the *intonaco* is of two qualities—of lime mixed with sand, and of lime mixed with marble dust. The beautiful whiteness and smoothness of this latter, and the fact that it was preferred by so many renowned artists—such as Michelangelo, Raffael, Correggio, and others—must naturally influence the practice of modern fresco painters; but it is very soluble, and is especially subject to the formation of saltpetre on the surface, which eats out the colors, as may be seen in the works of Giotto and his followers at Assisi. Another source of injury to these venerable paintings, entirely new in my experience, was pointed out to me. Lightning has entered the church and rippled over the surfaces of the paintings on the vaults, leaving its traces in the blackened colors, and then escaping without doing further damage.

Apart from all these causes of decay there were others connected with the technical processes, not only of the early mural paintings, but also of artists of later times. Having lately finished a history in detail of the methods of execution common in wall painting from the thirteenth to the sixteenth century, I will merely state at this time that the paintings at Assisi were commenced in fresco, but were invariably finished in tempera; that this last process contained in itself the elements of deterioration; and that these, in combination with the action of damp, the result of ruinous carelessness and gross ignorance in the custodians of the church, have produced the effects which we now see.

Where the *intonaco* had fallen I saw in various places the vestiges of the outlines of the subjects which Giunta Pisano and Cimabue had drawn with free, bold hand upon the ashlar wall. They have a weird, dreamy look. This ancient method of preparing the outline of mural paintings has been noticed and speculated upon by the late Sir Charles Eastlake; but he was only acquainted with the example of it which remains at Pisa in a work of Pietro d'Orvieto. The process is minutely described by Cennino Cennini as that followed by Giotto and his school. I have no doubt that it was common to all fresco painters from the time of Giunta Pisano to the last quarter of the fifteenth century. On careful examination I have traced it in various works down to those of Benozzo Gozzoli, who died about 1485, and who was heir of the method of wall painting of Fra Beato Angelico. Happily, I have seen no outline of his, for that would imply the fall

of the *intonaco*. I have no doubt, however, but that he drew his works in the same way, for he was especially conservative of the methods of the ancient masters. Thus, then, it may be inferred that the famous cartoons by Leonardo da Vinci and Michelangelo, prepared with such care and high finish at Florence, and which excited such wonder and admiration, were the first of their kind. I do not mean to say that full-size working drawings were unknown, — they are mentioned by the monk Theophilus in connection with glass painting, and in the archives of the cathedral of Florence there is a statement of a payment made to Lorenzo Ghiberti for a drawing for a window on *carta di bombagia* (which probably means a cartoon), — but these were of a very different size and character from the magnificent works described with such emphasis by Vasari. It is reasonable to suppose that they were a novelty, and a great stride in the nature of the preparations for mural painting. In the traces which I have been able to follow of outlines upon the wall or rough plaster, from the beginning of the thirteenth to at least the middle of the fifteenth centuries, or about two hundred and fifty years, the drawing is free but rough. Delicacy of manipulation, minute attention to form were, of course, impossible, and clearly never were thought of. It was very different when cartoons were prepared, and genius could express its inspirations on a surface which admitted freely both of the perfect representation of every detail of form, and also of a thorough treatment of *chiaroscuro*. In important respects no greater improvement was made in the fifteenth century than that from sketching on the rough plaster to drawing on the cartoon, and to this day it is observable that in schools of artists where the habit of designing upon cartoons is still recognized, the most masterly draughtsmen are found.

Having a favorable opportunity of climbing to the level of the mural paintings, on some of them, now black as ink, I traced the presence of a *mordent*, which showed that the lights were hatched with gold, and that the ornaments, embroideries, and outlines of the folds of drapery were gilt, as well as the aureoles, in imitation of the usages of the mosaicists. Always taking into consideration the prevalent ideas of art in the thirteenth century, and its conventionality, which, however, was combined with much dignity and even grandeur, we can imagine how great must have been the splendor of the interior of this noble church. I have already remarked upon the perfect harmony which existed between the colors and the ornaments of the interior and the painted glass. We are taught that the windows ought not to be blank where all around them is decorated; but we also learn that the style of the windows must be in perfect harmony with that of the frescoes, and that nothing can be in worse taste than to combine mural paintings in one style with painted windows in some other.

The piers in the apse and transepts are grained, in imitation apparently of granite; thus could our fathers in art of the thirteenth century offend against principles of taste which we, so much their inferiors, advocate. This love of such imitations is very old. In one of the tombs at Beni Hassan the limestone rock is dabbled in mockery of red granite. Roman art was full of such imitations, which suggest that even the Greeks had their graniers. Raffael lent his great name to the practice; but in spite of this array of authorities, and of the fact that we excel all who have gone before us in this imitation of woods and marbles, it would be well abandoned.

The processes now in operation at Assisi for the preservation of the remains of the mural paintings are eminently judicious. A new roof of admirable construction will in future prevent the walls from being soaked with rain water; where the *intonaco* is loose, it is carefully refixed, and made as solid as when it was first spread by the excellent thirteenth-century plasterers; where it has disappeared, the wall is cleaned, covered with a waterproof mixture, and then replastered to the level of the old paintings. Nowhere is any retouching allowed, and the famous but sadly-injured wall-pictures will be transmitted to posterity in the state in which they will be left by the able and conscientious operator who is now zealously occupied in a task of great difficulty under the supervision of Signor Cavalcaselle. The sorrow with which we regard the condition of these frescoes, to give them their familiar name, is intensified by our present knowledge of the durability of the art. Long ago Vitruvius said that fresco painting, which he so clearly describes as painting on wet plaster, "would last forever;" and the expression is hardly overstrained. The works of Cimabue, Michelangelo, and other great mural painters might, with ordinary reverence and care, have been transmitted to the present time in excellent order, the only decay being that arising from the use of tempera, which is so universally adhered to, and is so susceptible of change from the action both of damp and of impure air.

A spirit is now awakened which will save the remains of great works of art wherever the power of the Italian Government extends, and it is but fair to state that among the clergy also may be found zealous conservatives and intelligent illustrators.

Let us hope that a judicious Minister of Public Works will listen to the representations of his cultivated countrymen, and restore the choir of St. Francis to its former condition,[1] and that this will be the last instance of a spirit which, since the seventeenth century, has worked such mischief in the greatest monuments of Italian art.

Charles Heath Wilson.

[1] See *Academy*, July 20, 1878.

CORRESPONDENCE.

THE MASSACHUSETTS CHARITABLE MECHANIC ASSOCIATION'S EXHIBITION. II.

Boston.

Whatever I may have said in my last letter of any lack of interest in the exhibition, or of any clumsiness or lack of taste in the arrangement of the various exhibits, must not be held to apply to the department of fine arts. The building devoted to this department contains unquestionably the most interesting collections which have been brought together at any fair in this city, and they are arranged for the most part in a way which calls for nothing but praise. In the plan of the building Mr. Preston has, I think, used the irregular space at his disposal with great skill. The great picture gallery on the principal floor is spacious and well lighted, and the small rooms opening from it afford a great amount of wall space also, in the main very well lighted, and enable one to keep the pictures well in hand, so to speak, and to know where he is, and, what is more to the purpose, where the pictures are which he wishes to see or to avoid. The same may be said of the corresponding series of small rooms below, in which are arranged the water-color drawings, engravings, and china.

The committee have brought together an unusually large and fine collection of paintings. I hope it will not fail of doing the work for which it is so well calculated, — of showing the community the best features of a school of contemporary art which stands confessedly at the head of modern effort in this direction. This collection is a very curious and striking example of the completeness with which the French school of art has established itself, not only in the mind of this community as the only school whose pictures are worth buying, but also in the minds of the artists as the only school whose principles and methods are worth following. With the picture-buyers it is doubtless chiefly a matter of fashion. Nothing else would account for the fact that of the large numbers of wealthy gentlemen who come home every season from the grand tour, bringing their trophies in the way of fine art, we never hear of one who has by any chance purchased an English picture: or for the other fact that while the picture-dealers are making their little or large ventures in bringing over for sale the latest products of the French studios, we are never beckoned mysteriously into the innermost recesses of their establishments to see any masterpiece of an English artist. One hears occasionally of this or that fortunate connoisseur who has been permitted to purchase, at an extravagant figure, the last Daubigny or Corot or Dupré. But if it were not for the English newspapers we should scarcely once in a year be reminded of the existence of an English school of landscape, which, if it is not marked by characteristics as definite and striking as the French, is at least its worthy rival in tradition and achievement. In the present large collection there is, I believe, not a single picture by an English artist.

The unanimity with which American painters adhere to the principles and methods of the French school, and copy it, not only in their rendering but also in their choice of subjects, is not less remarkable than the exclusive recognition of that school by the buyers; and the most unfortunate but most natural result of such following is that they pass by, either unseeing or neglecting, some of the most characteristic and interesting features of American landscape. So much said, it must be admitted that the display of French art on the walls of the large gallery at the fair is imposing, and the managers are to be congratulated on having got together in the heats of summer so many masterpieces from the shut-up houses of their owners.

The most prominent picture in the room, as well by position as force of rendering, is "The First Step," by Bonnat, a prodigy of execution, like his picture exhibited at the Art Club two years ago, but less interesting than that, as it seemed to me, in the faces, — the child being particularly stolid and unattractive. Bonnat's pictures, however, astonish rather than charm, in spite of the domesticity of their subjects. Compare Frère's treatment of peasant life. The corresponding place of honor, on the opposite wall, is occupied by Landelle's "Salmacis," a conscious nymph who naturally draws the gaze of the visitor, but will hardly hold it long. Grouped around these are a noble company of pictures by Daubigny, Tryon, Rousseau, Dupré, Corot, Lambinet, Jacque, Diaz, and others equally eminent. The Daubigny, No. 227, a view on the banks of the Oise, seems to be one of his most agreeable pictures. The small Rousseau, close by, is a singularly simple and strong painting, so rude as to seem scarcely more than a sketch, of a bit of brown, rich woodland, under a white sky. Jacque is more known here by his etchings than his paintings, but here is a fine landscape, with sheep, somewhat cold in color, but very interesting. The Schreyer, No. 223, is admirable. Two Algerian scouts, alarmed, have dismounted, one gazing with anxious intentness in the direction of the enemy, holding meanwhile with difficulty his startled horse; the other, of different stuff, cowering behind his tired beast. The action is fine, the color very rich and strong, the costume of the scouts and the trappings of the horses giving ample opportunity for brilliancy and variety of color.

No. 216 is a beautiful picture by Chaigneau, a name to me hitherto unknown, marked as having taken the Salon medal the present year: an autumn landscape, the warm, hazy mellowness of the season remarkably presented, yet without the aid of any striking brilliancy of color. No. 214, a picture by Diaz, of a group of children playing blind-man's-buff, is a delightful piece of color, but the faces

of the children are as if modelled in wax, with an indescribable hollowness about the eyes, which gives them a queer, artificial look. There is no fun in the children either.

No. 154 is a superb View, — the old harbor of Marseilles, — the city lying in a hot sunset glow, a confused mass of houses on a hillside, enclosed on the one hand by a low, square tower, and on the other by the sweep of a round bastion; the golden waters of the harbor filling the foreground, bearing a pleasure boat with two figures under a crimson awning, rowing tranquilly over the still tide, and a single tall ship with furled sails, whose copper bottom, just seen in part above the water, reflects the light like an emerald. Its intenseness of color makes the placid Lambinet alongside look very cool and gray, but does not destroy its charm. There are three Corots, the one numbered 145 seeming to me the most agreeable picture, with less than the usual flimsiness of color, but with all the characteristic cool freshness which makes the chief beauty of Corot's landscapes.

[To be continued.]

ARCHÆOLOGY AND THE VERNACULAR ARCHITECTURE.[1]

BOSTON, October 14, 1878.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Sir, — In a paragraph of your summary for August 10, after referring to the subservience of modern English architecture to the influence of antiquarianism, it was remarked: "We are not permitted to forget that we are Americans and not Englishmen, and that our comparative freedom from the tyranny of archæology is a national privilege. We may master it, but it cannot master us. It is too far off." Your leading article of week before last (October 5) drew attention to the fact that your English contemporary, the *Architect*, of August 1, recognized the importance and interest of the question thus raised, and made this remark the text for an article, in which it is claimed that, notwithstanding our distance from the Old World, we cannot be emancipated from its influences, and that in art and letters, though free from parental control, we are still the daughter of England, and still retain a strong family likeness to the mother country. The article acknowledges that when classical antiquarianism passed into mediæval archæology in England in the first half of the century, the national instinct seized upon the national relics with an avidity never before witnessed, and the famous Gothic revival which followed upon this eagerness of appreciation was a phenomenon unparalleled in the history of architecture. In like manner in these more modern days, if the almost comical efforts of the Queen Anne style to trip up the old Gothic altogether on its sown ground of picturesqueness, and to substitute Low Dutch, seem to the American mind, which is less beset by traditions and monuments of the past, absurd and unreasonable, these successive revivals are indicative of a powerful national conservatism which, in the absence of an academical art like that of the French schools, or of a rigid scientific system of instruction in the styles such as prevails in Germany, is content to gather architectural inspiration from its own abundant historical past.

The *Architect* proceeds to express its belief that, in the absence of a venerable and suggestive past of our own, our natural affection for the mother country leads us unconsciously to follow in the tracks of the English architects, and to yield to the influence of old English traditions and relics; that, with all our undoubted freedom from the "tyranny" of archæology, every attempt to dispense with the influence of old art must, whenever made, inevitably lead to disappointment.

In like manner, it may be remembered, the *Architect* of December 15, 1877, in referring to this question of originality in modern art, endeavored to prove that in this country, where such originality is to be discovered if anywhere, there had not been the slightest evidence of our ability to strike out a new path in architecture; that accordingly our State Houses were, for the most part, showy and feeble renderings of bastard Italian, our country homes questionable reproductions of the suburban villas of London, our churches vain efforts to imitate English Gothic monuments; and that every effort after originality in this country had been frantic and undisciplined, and the artistic qualities of such work had been always in an inverse proportion to its novelty.

In your paper of January 5, 1878, you explained in reply the danger of making general statements regarding the arts of a country so widely spread as this, and subject to such various degrees of culture and discipline in its various parts, and maintained that though it was difficult to tell in what exact direction our art was tending, it was very far from being a mere reproduction of what was done abroad, and that our best work was by no means frantic in its deviations. On further reflection I see no reason to modify what you then stated regarding originality in American art: that the only sort of originality worthy of any consideration is that which results from the cumulative efforts of successive generations of artists; we have only just begun this career of progress according to our opportunities, but our advance within the last few years especially and in our larger cities has been marked, decisive, and characteristic. Doubtless the long-sought-for original art is even now in process of growth; it is not yet forthcoming, of course; indeed, there is no need to be in haste about it. Out of our necessities and intelligence new expressions of art have already been developed here and there, more or less successfully. You have often had occasion to show that there is already a certain crude and imperfect but unmistakable vernacular style existing among us, varying in various localities according to local differences of climate, materials, habits, and traditions, — healthy but rude developments of the historical forms of the Old World, subjected to all the errors of haste, ignorance, and ostentation, but nevertheless fundamentally genuine and true.

In the progress of American architecture our freedom from the *tyranny* of archæology — to use once more the expression which is the text of this brief homily — is of course only comparative. We are the heirs of all the treasures of the Old World. If England claims our first natural affections and interest, the other countries, with all their wealth of art and inspiration, are hardly less our own. We are not so overshadowed by any particular national series of traditions and monuments that, like our English relatives, we cannot escape from their influence, and we are consequently not confined in our invention, as they are, to a certain range of forms connected by association with our national history. Our boundless heritage has its dangers, no doubt; we have not learned how to classify and how to use it with discretion and due respect, how to adjust it to our new materials and new conditions of life. We are yet sowing our wild oats with a fruitless expenditure of resources. The civil architecture of our streets reflects the characteristics of all known styles. But discipline, reserve, refinement, self denial, and the other costly results of education and experience will come in time; moreover, we shall presently see that out of the natural influences which, notwithstanding this large appropriation of all the architectural forms, still manage to give to New York, Chicago, Cincinnati, Philadelphia, Boston, Baltimore, and St. Louis, to each a distinctive architectural character of its own, and in a larger sense have already conferred upon the architecture of the whole republic certain characteristics of nationality, — that out of these active influences will grow a style expressive of our civilization and commensurate with our resources. Our educated architects will of course continue to follow, with more or less of exactness, the styles and fashions of designing which are conveyed to us from the Old World in the illustrations of your contemporary journals; but these essays will continue to be mere phenomena; whatever in them is applicable to our needs will be adopted and absorbed into our vernacular. There are indisputable signs that the vernacular architecture, even in the new cities of the far West, has begun to exhibit the results of the sound training which may be obtained in some of our higher technical schools. There is something in our nature which makes us unjust judges of contemporary architecture; but the eagerness of our young men to learn, and their peculiar facility in imbibing the best results of education in art, certainly seem to give good promise for the future. V. B.

[1] We regret that an error in the make-up of our last week's issue has caused a delay in the publication of this letter. — EDS. AM. ARCHITECT.

THE CHICAGO THEATRE ORDINANCE.

[The following is the text of the ordinance to control the building and management of theatres, lately passed by the city council of the city of Chicago, and mentioned by our Chicago correspondent in our last issue.]

Be it ordained by the City Council of the City of Chicago, as follows:

SECTION 1. Every theatre, opera house, hall, church, or other building intended to be used for public assemblages shall be deemed a public hall, within the meaning of this ordinance.

SEC. 2. Any person desiring a permit to erect any public hall shall make application to the Superintendent of Buildings, in compliance with Section 58 of the building ordinance.

SEC. 3. No stairway to any public hall or part thereof shall rise more than ten feet without a platform; no winders, winding or circular steps shall be used. Each stairway and passageway shall have a strong handrail on each side thereof, through its entire length.

SEC. 4. Every public hall, with accommodations for five hundred or more people, shall have at least two separate and distinct exits, to be as far apart as may be found practicable. Public halls accommodating seven hundred or more persons shall have at least three separate and distinct exits. The exits from all galleries to be independent and separate from the exits of the main floor.

SEC. 5. Every public hall not used as a theatre, with accommodations for five hundred persons, shall have no portion of the main floor elevated to a greater height than thirty-five feet above the street grade. Public halls with accommodations for one thousand persons or more shall have the main floor not over twenty-five feet above the street grade; no portion of the main floor of any theatre with accommodations for five hundred or more persons shall be more than ten feet above the street grade.

In all such theatres, the proscenium wall shall be of brick-work, not less than sixteen inches thick, extending from the ground through and four feet above the roof; this brick wall to extend entirely across the building, from the floor of the stage to the ground. All openings required in any part of the wall (except principal opening) shall have proper iron doors.

SEC. 6. All auditorium floors in theatres shall be fire-proofed, either by deadening the same with at least one inch of mortar, or have the under side of joist lathed with iron, and plastered with at least one heavy coat of mortar.

All partitions for rooms or passages in theatres, if not made bodily fire-proof, shall be plastered on both sides on iron or wire lathing.

The preceding Sections shall apply only to theatres or public halls that may hereafter be erected. The following sections shall apply to theatres or public halls that are now or may hereafter be erected or constructed.

SEC. 7. All egress openings in public halls shall have the word "exit" conspicuously placed over them, and shall otherwise conform to the requirements of Section 39 of the building ordinance. The aisles or passages in

such halls shall at all times be kept unobstructed. Camp-stools, chairs, or other seats shall in no case be placed in such aisles or passages.

Sec. 8. The term "theatre" shall, for all purposes of this ordinance, include all public halls containing movable scenery or fixed scenery, which is not made of metal, plaster, or other incombustible material.

All material used for scenery shall be coated with such paint, washes, etc., as will make it, as far as possible, incombustible.

Sec. 9. All theatres or other places of public amusement having a seating capacity of over five hundred persons, having a platform or stage, and which use drop curtains or shifting scenery, shall have a suitable ventilator placed upon the roof, and opening to the space above the stage. Such ventilator to be arranged with valves or shutters that can be readily opened in case of fire, so that a current of air will pass over the stage and outward through such ventilator. Any other contrivance having the same effect, and approved by the Superintendent of Buildings, may be used instead of the ventilator above described. All such buildings to have a water stand-pipe and water plug to be placed in or on the stage or platform, or in its immediate vicinity, which shall be connected with the water-pipes of street mains of the city, and shall be put in under the direction of the Fire Marshal or Superintendent of Buildings, and to their satisfaction. Hose shall be attached to such stand-pipe, of such size as may be directed by said Marshal, to have nozzle and stop-cock attached thereto; such hose shall be of sufficient length to extend to the furthest limits of such building or place of amusement, and shall at all times be kept in good order and repair, filled with water under pressure, and ready for immediate use.

Sec. 10. All public halls with accommodations for one thousand or more persons shall have at least one stand-pipe in the street or alley on the outside of the building, from ground to roof, with hose attachments close to a window or door at each floor or gallery. Such hall shall also be provided with a fire-alarm telegraph apparatus, connected by the necessary wires with the headquarters of the city fire-alarm telegraph, or such other place or places as the Fire Marshal shall direct. It shall be the duty of all owners, agents, lessees, and occupants of such public hall, to provide such fire-extinguishing apparatus at such points about the building as the Fire Marshal shall direct.

Sec. 11. It shall be the duty of the owner, agent, lessee, or occupant of any theatre with accommodations for one thousand or more persons to employ one or more competent, experienced firemen, approved by the Fire Marshal, to be on duty at such theatre during the whole time it is open to the public; such firemen shall report to and be subject to the orders of the Fire Marshal, shall be in uniform, and shall see that all fire apparatus required is in its proper place, and in efficient and ready working order.

Sec. 12. The license for each public hall shall state the number of persons it has accommodations for, and no more than that number shall be allowed to enter such hall at any one time.

This number shall be governed by the number of feet of exit of the doors and passages, and shall be approved by the Superintendent of Buildings.

Sec. 13. The Superintendent of Buildings, or the Fire Marshal, shall have the right to enter any public hall and all parts thereof at all reasonable times, especially when occupied by the public, in order to properly judge of and discharge their duties.

Sec. 14. Any person failing to comply with, or guilty of a violation of any provision of this ordinance shall be subject to a fine of not less than twenty-five nor more than two hundred dollars. Every such person who so fails to comply with, or is guilty of a violation of any provision of this ordinance shall be deemed to have been guilty of a separate offense for each day the same continues, and shall be subject to the penalty imposed by this section.

NOTES AND CLIPPINGS.

American Awards at Paris.—It is now officially known that the awards to American exhibitors at the French Exposition number 750; namely, 10 grand prizes, 20 diplomas of honor, 134 gold medals, 200 silver medals, 220 bronze medals, and 156 honorable mentions. The aggregate is larger than the whole number of American exhibitors at the Paris Exposition of 1878, and a larger proportional award than to any other nation represented at this Exhibition.

The Holly Heating System in Detroit.—The Detroit Steam Supply Company has secured a building wherein to place its first battery of boilers, fifteen in number, and intends to lay about two miles of pipe at once. The right to introduce the system was purchased for thirty thousand dollars.

Panic.—On the 16th instant a panic took place in the colored Baptists' church at Lynchburg, Va., which was in many of its incidents a repetition of the Brooklyn Theatre disaster. During a marriage ceremony a piece of plastering fell from the ceiling, and instantly caused a stampede among the congregation. The service was performing in the second story, and the frightened throng in its attempts to escape overthrew and trampled on those who first reached the stairs, and who had not time to descend before the crowd behind was upon them. Nine women were killed outright, and the seriously injured number thirty or more.—On the following day, the pupils in the grammer school on East Houston Street, New York, were overcome with panic at a false alarm of fire, raised within the building, and rushed from the school-house in spite of the efforts of the teachers to control them. Strangely enough, out of nearly two thousand children who were in the school-house only one, a child of eight years, was seriously hurt.

A Terrestrial Balance.—At Ortali, a small township containing a few houses, near Quarata in the province of Arezza, the earth has gradually fallen until it is now twelve or fifteen feet below the original level. The houses of the village have lost their equilibrium, and threaten to fall asunder. The authorities have ordered the inhabitants to remove to huts which have been set up in the fields, and thither they have fled with their families. On the other hand about 200 yards from Ortali the earth has risen, so that the rising of the ground has been visible at times.

Mr. Millais is about to paint a portrait of Lord Beaconsfield.—*The Keystone.*

The Contract for the St. Gothard Tunnel.—Two years from this time the great St. Gothard Tunnel through the Alps, uniting Switzerland and Italy, must be completed, or the contractor, M. Favre, will have a heavy penalty to pay. Under the terms he must pay $1,000 for every day later than October 1, 1880, on which it remains unfinished. If six months afterward it is still uncompleted, he loses $2,000 per day, and if twelve months go past without its being turned over, he forfeits everything, including his bond of $1,500,000. The undertaking is a gigantic one, and some engineers doubt if Favre is not badly beaten at last. The main tunnel is over twenty-nine thousand feet long, and the work on it is only prosecuted under tremendous difficulties. All the power used in drilling is furnished by compressed air, which is prepared outside by powerful pumps and stored up in vast tanks. The locomotives which draw from the tunnel the blasted rocks are also run by compressed air, as the use of steam in such a hole would be impossible. As it is, the men at work often suffer excessively from the foul vapors, partly natural and partly produced by the explosions of dynamite, which are so constant that an observer compares them to cannon firing in a battle. These gases would collect and be fatal, except that the exhaust air from the drills is employed to drive them towards the mouth of the excavation. Favre is laboring with splendid energy, and the working force is as large as can be put on. It is vastly to his interest to hurry, for he will receive a bonus of $1,000 for each day previous to October 1, 1880, on which he has his task finished. The tunnel will cost about $55,000,000, although when it was first undertaken the estimates were some twenty millions less than the above figures. The discrepancy was occasioned by engineers' mistakes, and when it was found that the enterprise would be much more expensive than originally announced, the discovery nearly discouraged all concerned. But the Swiss, Italian, and German governments increased their subventions, private subscriptions were stimulated, and financial success was assured. The laborers employed are Italians, about the only workingmen who could be employed at the small wages paid, averaging from 60 cents to $1.25 per day. A writer speaks of them as the Chinese of Europe, but we doubt if even John would not demur at being asked to do such laborious, exhausting, and dangerous work for the same amount of pay.—*Hardware Reporter.*

Dr. Schliemann's Recent Discoveries.—Dr. Schliemann has telegraphed from Ithaca to Athens: "We have made a great discovery. On the plateau which extends toward the western shore of the southeast part of the island we have found in digging ninety houses of cyclopean construction, belonging to the Homeric city of Ithaca. Impossible to express here the methodical result of our excavations. The winter rains have washed into the sea all the ancient treasures. Nevertheless, the discovery of these ruins constitutes a valuable treasure for the island. All the lovers of antique souvenirs will hasten to visit the city of Homer."

The Bells of St. Paul's.—The cost of the twelve new bells which have been placed in the northwestern tower of St. Paul's Cathedral, London, together with the work of mounting them, has been about $100,000. The largest bell weighs 6,500 pounds and the smallest 500, while the weight of all is nearly 40,000 pounds. No. 12, the largest, was given by the corporation. London has waited more than 200 years to hear a chime of bells from its cathedral belfry.

Under-Ground Telegraph Wires.—The city council of Philadelphia have ordered the removal of telegraph poles from the streets of that city, and experiments have been making to produce a wire that could be laid under ground and worked satisfactorily. The McKeesport *Times* gives an account of some interesting experiments made at the tube works, in manufacturing "insulated wire." The wire is now being made in sections of ten feet, but can be made as long as thirteen feet. To make the wire a copper telegraph wire is inserted in a glass tube of the same length, and sufficiently large to admit the wire easily. The glass tube is then inserted in an iron tube just large enough to admit it. They are all then placed in the furnace and heated to a red heat, and then run through the rolls, which compress copper wire, glass and iron tubes, all into one mass, but without crushing them. The ends are then ground to a convex surface, and the ten-foot sections coupled together like gas-pipe, the convex ends allowing the centres to strike first, thus establishing the electrical connection. The pipe will be enamelled before being laid.

Prevention for Lead Poisoning.—A remarkable case is given in the *Journal de Médecine* of the effect of the habitual use of milk in whitelead works. In some French lead mills it was observed that in a large working population two men who drank much milk daily were not affected by lead. On the general use of milk throughout the works, the colic vanished entirely. Each operative was given enough extra pay to buy a quart of milk a day. From 1868 to 1871, no cases of colic had occurred.

Spiegel Iron.—A company for the manufacture of spiegel iron has lately been incorporated at Chester, N. J., with a capital of $100,000. The manganiferous ore from which this spiegel iron is to be manufactured is found in New Jersey, though the company will not rely altogether upon that resource, but will draw a portion of the supply of ore from Spain, where it can be obtained at a trifling cost. Already a number of vessels which would otherwise have returned from the Mediterranean and Spanish ports in ballast have been chartered to bring this ore from Santander to Perth Amboy at the low rate of five shillings per ton. It is not the intention to attempt the manufacture of anything of a higher grade than twenty per cent spiegeleisen until such a time as trustworthy data shall have been obtained that will warrant venturing further. France to-day stands at the head of this manufacture. She imports all her ore from Spain and Italy, and makes high grade spiegeleisen so successfully and cheaply that the English makers say they can buy cheaper than they can make. England stands next in the list, and also imports all her own ore from Spain and Italy. Germany, which is the largest maker of low grade spiegeleisen, which she makes from her own spathic ores, is dependent upon Spain for rich ores in the manufacture of high spiegeleisen. The duty on spiegeleisen is only seven dollars per ton, exactly the same as ordinary pig iron, it coming in first under that head, and not being classified in the tariff as a separate article of manufacture.

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CONTENTS.

Summary: —
The Forty-second Street Tunnel. — Faulty Inspection. — Faulty Construction. — Building in Philadelphia. — Mr. Walsh and the St. Louis Custom House. — The Chicago Court House. — Sir Francis Grant 145
The Open Fire-place. III 146
The Illustrations: —
The Pilgrim Chapel, Brooklyn, N. Y. — House at Oyster Bay, L. I. — Houses near Cincinnati, O. — La Porte Guillaume, Chartres, France 147
Correspondence: —
Letter from London. — Letter from Boston. — Letter from New York 148
Turner's Etchings 150
Industrial Science Drawing 150
Communication: —
A Western Competition 150
The Castellani Collection 151
Notes and Clippings 152

The fall of the vaulting of the Forty-second Street Tunnel in New York, has stirred up a great many complaints of the careless inspection under which work is allowed to go on in that city. No doubt the complaints are justified. There is no reason to question the statements that were published, when the first part of the vault fell, — that the bricks were inferior and carelessly laid, and that the mortar did not stick together, — statements which are repeated by persons who have examined the ruins of the part that last fell. The officials of the office of Public Works, driven to choose between an acknowledgment of faulty design and of bad work, naturally say, bad work; but bad work means bad inspection, for the object of inspection is to secure good work. The Department of Buildings is, apparently, no better off in this respect. It is only a month or two since the fall of a new building at the corner of Broadway and Fifty-second streets showed that the inspectors had allowed it to go up with walls thinner than the building laws prescribed, improperly bonded, and without anchors to hold the floor timbers to them. Not the least painful phenomenon in these cases is the audacity with which the culpable persons meet them, — like the examiner of buildings, who in this very case is said to have argued that thinner walls were safer than thicker, because when they fell two bricks might not kill a man, while three would. All this is natural enough in a city where these officials, being appointed simply for political reasons, may be presumed to be inexpert and without interest in any but their political functions. If the people of New York are willing to pay in lives as well as in spoliation for the privilege of this sort of politics, we may hope that their experience will at least look uninviting to other people.

But while there is no danger of condemning too severely such slovenly workmanship and inspection, it is not well to let the dust that is raised over these faults conceal the carelessness or the incapacity of the original offenders. At present, attention seems to have been diverted from the faulty design of the fallen tunnel vault. After the first fall the coroner's verdict was, that careless loading by the contractor caused the disaster, and the work was continued substantially on the same plan as at first. Even since the second fall, it is said the engineer in charge derides the idea of faulty construction. He has been dismissed, but unless the essential vice in the design of the tunnel is made known, the lesson of careful construction that the disaster ought to teach, which is at least as important as that of careful inspection, will be lost. The curve of the vault is not only one of small rise, but is of the weakest possible form for its purpose. It is a flat semi-ellipse, or rather a compound oval, a curve that would do very well for a bridge, but is unfit for a vault with a heavy vertical load, the strong curvature being at the haunches, where from the peculiar conditions of the load the pressure is least effective, and the crown being much flatter than the height alone would indicate, while the shell is dangerously thin. We have not within reach such an accurate record of the vault section as would enable us to compute its curve of equilibrium with precision, but a simple calculation will be enough to give an approximate idea of the conditions. The height of filling above the vault is so great, and the additional weight on the haunches so slight, that it would be safe to consider the load as uniformly distributed. In this case the strongest form of vault would be one of which the curve was a parabola. With the given span and rise a segmental arch would have answered if the shell had been thick enough, but the curve adopted was weakest of all. Taking the parabola, as the strongest, we may compute what would have been the horizontal pressure on the shell at the crown, by the common formula $H = \frac{p x^2}{8y}$, where H is the horizontal pressure required, p the load per unit of horizontal surface, x the span, and y the rise of the vault. Assuming 100 pounds per cubic foot to be the weight of twenty-five feet of filling above the vault, p will be 2,500 pounds. Then for a span of 40 feet, and a rise of 10 feet, we have for each foot in length of the tunnel, $H = \frac{2500 \times 1600}{8 \times 10} = 50{,}000$. This would have been the horizontal pressure on each linear foot of the shell if the vault had been of the strongest form. The shell being of six courses, or two feet thick, the pressure on the brick work would have been 25,000 pounds per square foot. At the springing it would have been over 35,000 pounds per square foot. Twenty thousand pounds, or ten tons per foot, would be all the pressure with which a careful constructor would have dared to load the brick work which he could expect to get in ordinary contract work under watchful inspection. But with the form adopted for the vault, the pressure must have been much greater than on the parabolic vault we have supposed. In other words, a vault of weak form and bad workmanship was apparently loaded with a greater weight than would have been safe for the same thickness of shell in the strongest form of arch with good workmanship. This allows nothing for the danger of the curve of equilibrium passing outside the safe position, for of that we have no means of judging. A slight yielding of the weak mortar in the joints was enough, under the pressure, to let the flat crown of the arch sag, till, as the earth settled down upon it, it fell through altogether. Here then was an important structure intended to carry a tremendous load, and built in a manner which a little simple figuring would have shown to be foolishly inadequate to its use. But it was doubtless built by rule of thumb, and probably it never entered the head of anybody concerned to use the established means of finding out whether it was fit for its work or not.

It is the lesson of all this, as of many like disasters, that it is not merely careless building, though that is bad enough, but ignorant building that brings us into trouble. The latter fault is really the more dangerous, because while it is more insidious than the other, it is one great cause of it. The efforts of the people who are responsible for it to put it out of sight ought therefore to be strenuously resisted. The danger is the greater because, while we are venturing on all sorts of new constructions, we have taken leave of the old-fashioned habits of solid building, and competitions and the system of contract work are forcing the method of building down to the cheapest possible conditions. "Practical" constructors are continually trying to do things they have not done before, and to do them in the quickest and most economical way possible, while they are as innocent as children of the scientific knowledge by which alone such experiments are made safe. In a generation which is covering the country with more important constructions than any before it, the greater part of the persons who are responsible for these constructions may be said not to know that such safe knowledge exists; and the mass of the people whose property and lives are risked by them, are disposed for this reason to deride it as unpractical. It is an injury to the community, then, when complaint of the bad execution of a piece of work, especially if it be public work, is allowed to divert attention from the fact that it has been ignorantly and badly designed.

The recent gale has taught in Philadelphia something of the same lesson of the danger of unsubstantial building that other cities have been learning from fires and downfalls. More than seven hundred buildings were more or less torn to pieces by the wind, which after all, though a violent gale, was not a hurricane; and in the newer and more slightly built regions whole rows of brick houses were blown down. Such wholesale destruction shows that Philadelphia must have its good share of the bad building that infects all our large cities. It is true that the wind blew very hard, its velocity measuring seventy miles an hour or so; but one of the chief uses of building at all, is to shelter people in rough weather. It is quite possible to make sure in every city, by proper laws and inspection, that all buildings

shall be capable of standing in any weather that is not absolutely unprecedented, just as they can all be made practically incombustible. Philadelphia has the repute of being a more substantial city than most in the country. It has been her boast that more families lived in their own houses there than in any other city, and that tenement houses were almost unknown. This characteristic has some admirable results, but some that are not quite so good. It has encouraged building enormously, and has developed the system of "bonus" building, which was described by a correspondent in this journal not long ago, and than which no greater provocation of rascality among builders has ever been contrived. Philadelphians have been able to rely longer than most of the neighbors on their old traditions of solid workmanship; but no city can live by its traditions in these days, or do without the safeguards of careful laws and stringent inspection. The real trouble here is what it is everywhere, as we have argued above, — a growing ignorance of how to build. Thousands of men are having houses built without knowing what good building is, thousands of mechanics are building houses without knowing how to build good ones. This is due partly to the immense increase of hasty speculative building, partly to the demoralization of the trades, through the influence of trades-unions, the loss of apprenticeships, and other evils. The whole community is getting used to poor work, and a large part of it, the country over, has come not to know that there is any other. A complete remedy is hard to find, but good building laws and good inspection are a considerable part of it.

Mr. Thomas Walsh, to whose troubles as superintendent of the U. S. Custom House at St. Louis we have before alluded, has lately written a long letter to the *Cincinnati Gazette* in answer to the various accusations which have been published against him. The answer consists of general denials of the charges of dishonest dealing in his superintendence of different public works, supported by letters from the persons with whom he was said to be implicated, and what is of more account, from the judges of the County Court, whose architect he was, and from the bench of the State of Missouri. To the principal charges, of collusion with the contractors for the Custom House building which he superintended, his answer is, that after the technical failure of the first indictment against him the matter was dropped by the District Attorney, and no second indictment was ever prepared. The strongest testimonial in Mr. Walsh's favor is the letter subsequently sent to the Secretary of the Treasury, asking for his restoration to the position of superintendent of the Custom House, from which he had been removed pending the trials, and signed by the Chief Justice and Associate Justices of the State, the Circuit Judges, and several other prominent officials. The only things in his case with which the public is concerned, are the accusations about the Custom House; but it is fair that where the complaints against him have been published his answer should be made known. Since the charge of conspiracy with the contractors was not followed up, it may be inferred that the District Attorney decided that he could not sustain it. The question of the superintendence still remains, and we have seen no disproof of the complaints of bad work done or accepted under his supervision, nor does it appear that even the strong request which we have cited, moved the Secretary of the Treasury to reappoint Mr. Walsh.

Perhaps no building of our day, not even excepting the Washington Monument, has shown anything so nearly like a human instinct for getting into trouble as the Chicago Court House, the divided structure — half city building, half county building — of which our readers have first and last heard so much. After the question of the divided dome had been set at rest, for the present at least, the two architects at last turned into one, and the one material into two kinds of stone for the two halves, — financial troubles have set in heavily. The county having been too embarrassed to furnish money to continue its half, the city has had a chance to try to overtake it, but finds difficulty in providing funds; and now there is talk of reducing the cost, on the city side, by leaving off the upper story, which many people think will be useless. The opponents of this change insist that it will only be putting more money into the contractor's pockets without a proportionate saving in the whole cost; for the builders having contracted for the whole work, will have an additional opportunity to increase their profits by under-estimating the deductions to be allowed for the changes. There are two ways, say they, of increasing a contractor's profits beyond what his contract allows him, — by extras and by deductions, — and the extras having been tried as long as is safe, the other means will now be a welcome one. It would be hazardous for an outsider to express an opinion on this question, but architecturally, at least, we might expect the city to suffer by the change; the architecture must be very offensive if the suppression of one story of it would atone for the anomaly of making the building, intended to be perfectly symmetrical, a story lower in one half than in the other.

English papers tell us of the death of the president of the Royal Academy, Sir Francis Grant. The younger son of a Scottish laird of Perthshire, and educated as a gentleman, he seems to have owed his position as much to circumstances and to a natural cleverness as to the special talent of a painter. He was born in Edinburgh in 1803, and was at first brought up to the law. A passion for field sports diverted his energy from study, and he is said to have deliberately announced his plan to spend his inheritance of fifty thousand dollars in the field, before he set to work to make his fortune as a lawyer. When this was done, however, a natural tact or native astuteness taught him that he could do better as a painter, and at twenty-seven he began painting the portraits of his friends, who were many and influential. His work soon became popular, and he went to London, exhibiting his first picture in the Academy in 1834. In 1842, he was elected an Associate of the Academy, in 1851 a Fellow; in 1866, he succeeded Eastlake in the chair, which had been declined by Landseer, and was knighted in due course. He was an honorary member of the Royal Scottish Academy, of the Société d'Artistes Belges, and of the Philadelphia Academy of Fine Arts. He was a facile and brilliant painter of portraits, but apparently painted little else. The only two other works that we find recorded are two sporting pictures, the "Hunt of his Majesty's Stag-hounds" and the "Melton Hunt." The first of these brought him much distinction and gained a gold medal at the Paris exhibition of 1855; it contained portraits of forty-six noted sportsmen of its day. Except for these his works seem to have been almost exclusively portraits. His gentlemanly address and *savoir faire* lent their character to his painting, and joined with his social position in making him popular, both personally and as an artist, especially as a painter of women. The same qualities won him the presidency of the Royal Academy, a position which, since its duties are as much social as professional, is more apt to be the reward of worldly success than of artistic greatness, as is perhaps illustrated by the fact that four out of six presidents have been fashionable portrait painters. Sir Francis Grant's social tact and popularity shone in his administration of the Academy and in his public bearing as its representative. Mr. Leighton, says the *Builder*, is much talked of as his successor. Mr. Millais, Sir John Gilbert, and Mr. Calderon are also mentioned.

THE OPEN FIRE-PLACE. III.

It is remarkable that, while the open fire-place was one of the earliest contrivances invented to contribute to the health and comfort of man, the upright flue for carrying off the injurious products of combustion should have remained one of the latest.

It is true that the principle of the modern chimney was probably understood long before the practice of constructing it became general, but it was so rare an object, even in the sixteenth century, as to have excited the surprise of Leland, who, speaking of Bolton Castle in his "Domestic Architecture," thus expressed himself: "One thynge I muche notyd in the hawle of Bolton, how chimeneys were conveyed by tunnells made on the syds of the walls betwyxt the lights in the hawle, and by this meanes, and by no covers, is the smoke of the harthe in the hawle wonder strangely conveyed."

According to Peclet, chimneys appear to have been unknown to writers of the early part of the fourteenth century.[1] But, once introduced, their merits appear to have been rapidly appreciated, since we find it stated that in the reign of Queen Elizabeth, apologies were made to visitors if they could not be accommodated with rooms provided with chimneys, and ladies were frequently sent out to other houses where they could have the enjoyment of this luxury.

Thus the general use of the chimney is quite recent, and it was not until the time of Savot, Franklin, and Gauger, that we have record of any serious attempts to combine the cheerfulness of an open fire-place with the economy of an enclosed stove.

The science of the proper ventilation of buildings is still more recent. "Till the discoveries of modern science," says Dr. Reid,

[1] "L'époque à laquelle il faut placer l'origine des cheminées est assez incertaine; les auteurs du commencement du quatorzième siècle semblent ne les pas connaître. La date la plus ancienne, et en même temps la plus certaine où il ait été question des cheminées, est l'année 1347."

"revealed the nature and composition of atmospheric air, and the reciprocal action that ensues between it and the blood, the architect was, in respect to this question, like a traveller without a guide, and had no distinct appreciation of the position in which man is placed in respect to the atmospheric ocean in which he lives." Even where these facts are understood by scientific men, the great mass of the people still remain in ignorance of them, and the rough treatment to which our lungs are subjected in the form of draughts, poisoning by vitiated air, and sudden changes of temperature, often inducing fatal diseases of the organs of respiration — diseases which might be prevented if the elements of physics and hygiene were more generally taught, — shows how little the value of pure air is appreciated by the public. This want of knowledge and appreciation of the subject explains in a measure why the progress of improvement is so slow. The time has been too short to make men believe that an atmosphere apparently pure and transparent as well as agreeable to the senses, may be filled with the most subtle poison. A hundred years is insufficient to work a revolution in the habits and prejudices of men for the sake of a thing which they can neither see, smell, feel, hear, nor understand.

What progress has been made will be seen from the following historical sketch.

EARLIEST FORMS OF THE OPEN FIRE-PLACE.

In the earliest ages the chimney consisted of the entire house, the fire being built in the middle of the building or hut, and the smoke escaping from the roof, as is shown in Fig. 4. Barbarous as this

Fig. 4. From Viollet-le-Duc.

arrangement may seem, it nevertheless has certain advantages we should not lose sight of in making our improvements. The heat of the fire is utilized to a far greater extent than is the case with that burning under our modern chimney. All the radiated heat is obtained and a large part of the heat of contact of air. As a ventilator it is superior to our modern apparatus, since no impure air can remain for a moment in the room, and the cold draughts entering are not drawn to a single spot limited by the height and size of the mantel, as with us, and being, therefore, less concentrated, are less dangerous.

In its manner of disposing of the smoke it is, of course, inferior, notwithstanding the statement of the owner of the hunter's cabin

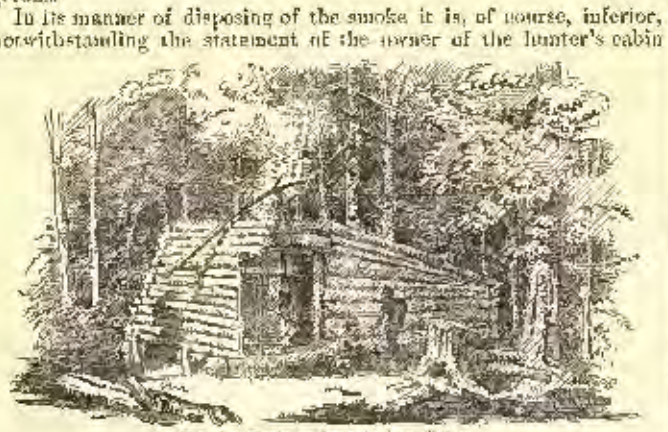


Fig. 5. Backwoodsman's Log Cabin.

represented in the accompanying sketch, that the smoke never troubled him in the most unfavorable weather.

A central flue constructed of sticks smeared on the inside with mud or clay, and descending from the opening in the roof to within a safe distance of the fire below would improve the draught and prevent the smoke from blackening the roof, though at the expense of some of the heat.

The next step made to improve the draught by means of a flue, as described by Viollet-le-Duc, in his "Habitations of Man," Fig. 6.

Fig. 6. From Viollet-le-Duc.

But the description must have been purely imaginary, as no evidence exists of the use of such flues at the early age indicated by the writer. The fire was in this case supposed to be built against the wall of the house. Thus a large part of the radiated heat of the fire was cut off and no corresponding change was made to regain the proportion of heat thereby lost.

Gradually, for the purpose of avoiding lateral currents of air, jambs were built on each side of the fire, to direct the air upon the fuel, and the chimney flue was brought down to within a few feet of the fire. By this step another large portion of the radiant heat was lost, and the whole of the heat of contact of air, without an effort to obtain a corresponding compensation.

THE ILLUSTRATIONS.

THE PILGRIM CHAPEL, BROOKLYN, N. Y. MR. J. CLEVELAND CADY, ARCHITECT, NEW YORK.

This chapel is built of Philadelphia pressed brick, relieved with terra-cotta finish. It will accommodate twelve or fifteen hundred persons who have an unimpeded view of the speaker.

HOUSE OF MRS. S. S. ADAM, OYSTER BAY, LONG ISLAND, N. Y. MESSRS. POTTER AND ROBERTSON, ARCHITECTS, NEW YORK.

HOUSES FOR JAMES A. FRAZER, ESQ., CINCINNATI, OHIO. MR. JAMES W. McLAUGHLIN, ARCHITECT.

These houses have recently been built for James A. Frazer, Esq., on Auburn Avenue, at the corner of Evans Street, Mt. Auburn, a suburb of Cincinnati. The bricks are from Newport, Ky. The roofs are covered with Virginia slates, the ridge-crestings being of Akron tiles. The stair-cases are of oak, and the remaining interior finish of selected pine, varnished.

LA PORTE GUILLAUME, AT CHARTRES, FRANCE. DRAWN BY MR. JOHN W. H. WATTS.

Chartres is too well known as a city full of interest to the architectural student to need particular description. La Porte Guillaume is situated in the lower part of the city, between the branches of the Eure, a very insignificant but nevertheless picturesque little stream. The subject of the sketch is but one of the many interesting places along its banks.

CORRESPONDENCE.

SO-CALLED QUEEN ANNE WORK. — MR. BURGES'S HOUSE.

LONDON, October, 1878.

Is Queen Anne dead? asks a lively writer in a recent number of *Truth*, as he despairingly bewails her influence in all the English furniture at the Paris Exhibition. However it may be for furniture, after a sincere search about London I am convinced she is dead as regards architecture. Not only is she dead, but so few and indistinct are the footprints the good queen left behind her that almost any font will fit them, and there are plenty of masqueraders at present capering in them. If the prevailing fashion introduced by the mania for bric-à-brac were called the anonymous style, it would be comprehensible; but then it would not sound so well, and in England, at least, everything is in a name. Anything which is not identified with the late Gothic revival is boldly appropriated for this "pot-pourri" of architecture. Although the spirit of annexation is rampant here at present, I was not prepared for the following proof of it. Wishing to look up what books there were on this Queen Anne style, I went to Batsford's, the architectural book-seller's, — strangely enough his modest shop in High Holborn suffices for the whole London profession, — and there was told: "Oh, we have no books on that style. Our Queen Anne architects take their details from Sauvageot's work on the French Chateaux!" Hence, "Queen Anne," on the *facus a non facendo* principle.

Houses however, were built of course, during the reign of this personage; and at Chelsea I found a row of *bonâ fide* Queen Anne houses looking upon the Thames, across a strip of trees and verdure. The striking characteristic of these dwellings in Cheyne Row ties, to use a contradiction, in their unobtrusiveness, — certainly not a quality of their recent namesakes. A plain brick front of two or three stories, with flat, sloping roof and simple cornice, is enriched by a wooden porch with a classic order and delicate mouldings. Nothing could be more simple and commonplace; but there is a decided charm in these quiet homes, which is wanting to yonder block, fortunately for comparison in the extreme present fashion. Their narrow and lofty fronts are carried still higher into exaggerated gables, while tall, narrow windows suggest the view on a back-yard, rather than that across an animated river. The first tendency of this style was in breaking away from the conventional modes of building, to allow common sense to express itself; but the desire to be original — perhaps I should say to be odd — has drifted it far to the leeward. In one group of these houses, by Mr. Godwin, an octagonal front is recessed, so that the side windows, instead of getting a wider oblique view, look upon the wall of the next house. The entablature runs, however, straight along the front of the two houses, and a brick architrave, without suggestion of arch-work, is carried across the recessed corners. Of course there must be a hidden band of iron, but it looks most uncomfortable. In the next street the same architect has just built a house for Mr. Whistler, the painter. As they are both men who are nothing if not original, something extraordinary was to be expected. The first result was so plain and ugly that the Metropolitan Board refused to grant a license for it. It was then ameliorated enough to pass that most tolerant of critics. Its small front door opens directly on a landing of the staircase — an excellent way to break the necks of burglars and of all who are not forewarned that their first step from the door will precipitate them headlong into the large atelier below. Not a bad feature in this latter is the segmental arch which divides one end of the room and the fireplace from the main part. This fireplace is in the present fashion, and has a small opening for the grate, while a wide portion around it is filled with tiles. As is often the case with eccentric designs, practical questions have been neglected; and this first story, really a basement below the street level, has not been protected against the damp, and is found uninhabitable; while the china closet has proved fit only for a coal-bin, and the servant's room has been turned into the former. I quote these details to show where the present tendency to be original at all cost is carrying some of the best known men; for Mr. Godwin, besides being known as the editor of the *British Architect*, has done far better things than these later works. In such a melancholy little house I was not surprised to find on Mr. Whistler's easel "a symphony in blue;" the wonder was that under such positive circumstances it was as vague as this vagnest of impressionists always is.

So much for the bad side which the effort after odd effects has introduced into these latest buildings. But good has come from the increased attention given to brick-work, for "Queen Anne" work abounds in flat pilasters and delicate mouldings in brick or terra-cotta. The English have hitherto been far behind both the Germans and ourselves in the quality of bricks and the use made of them. There are very few buildings of fine face bricks in London, and their coarse, porous ones, by absorbing soot, add to the dinginess of the city. Now, however, a finer quality is necessarily used in this new style, of which it is fair to mention the best examples. Many of these were built for painters, who are certainly appreciative of "Queen Anne." Away from the everlasting smoke and fog of the city, at St. John's Wood, Hampstead, Chelsea, and South Kensington, many painters have built. Close to Holland Park is a particularly interesting group of new houses, all of them original in design. Val Princeps and Leighton are side by side, in houses designed respectively by Webb and Aitcheson. A few rods off the leaders in the style, R. Norman Shaw and Stevenson, have built for Colie Hunter and Fildes. Next comes Mr. Burges's house, of which I will speak later, as he would be horrified to be classed with the "Queen Annes," though surrounded by them; for on the other side Watts has a house, by Cockerel. As these men, both architects and painters, if not all academicians, are regarded as the "immortals" of their professions, this group is full of interest, and the houses themselves are picturesque and homelike, and generally entirely of brick. In this same neighborhood both Stevenson and Shaw have built several handsome and characteristic dwellings. The design of one, by the latter, published in the *Builder*, June 4, 1875, gives the best characteristics of the style. It is of brick, five stories, with lofty gables; the ground-floor is recessed, and has slight wooden bay-windows with tiny panes, such as one still sees in such old English towns as Canterbury. A fine business store by the same architect breaks agreeably the classical monotony of the city. From the late Gothic revival we at home are apt to regard London as of that style; whereas it is really the city in Europe where the "orders" are most used and abused. In the city there is hardly any exception to this endless Renaissance reproduction, and the latest are like the first.

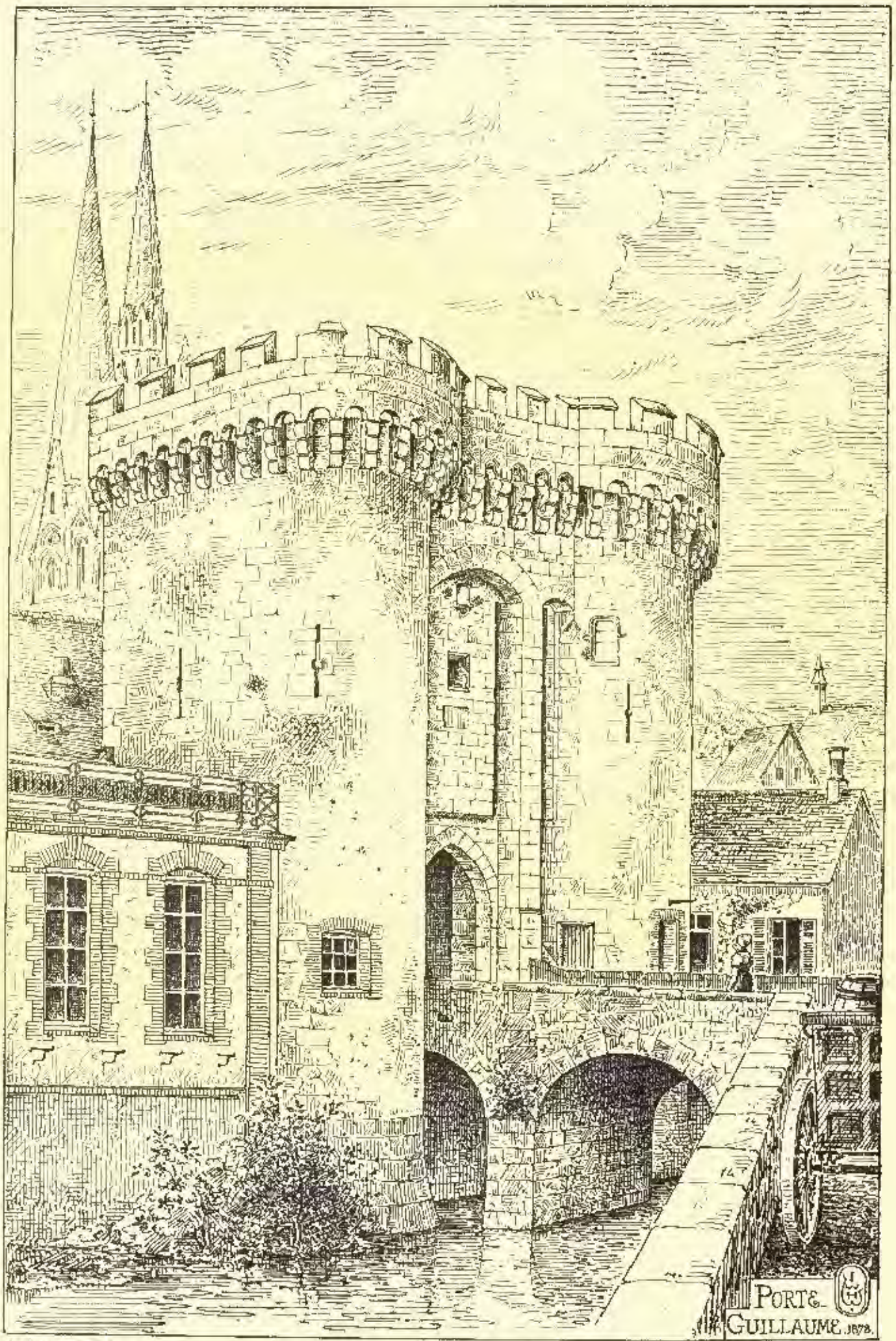
Mr. Burges has spared neither time nor expense to make his house artistic, and only half the rooms are finished, so lovingly does he "potter" over the decoration of them. The house is of brick, with stone finish, and is picturesquely grouped, a round stair turret flanking the main gable towards the road. The entrance is at the side through a richly sculptured bronze door. Though he is acknowledged as an authority on decoration I was told to expect the most violent coloring and contrasts, and so was not surprised at the brilliant tints of the hall, which is two stories in height, and is lighted by a large, colored glass window, with full-size flying figures. The stairs start from the hall and disappear into the tower, and then emerge on a balcony above. The library is the only room as yet entirely finished, and is as original as beautiful. To use the last London "art" slang, it is "a symphony in gold." One third the height of the room is taken up by a frieze of the deepest gold, a scroll pattern picked out with red. This would be glaring were it not skilfully led up to by paler tones of gold below. The wooden bookcases are of greenish gold covered with painted figures, in a mediæval style. Where the wall shows it is stamped with a red gold pattern. The ground of the painted ceiling has a deliciously soft, golden tint, and it is hard to realize that this hue comes from contrast, for it is only the natural color of the pine!

Mr. Burges is full of quaint, mediæval fancies, which peep out unexpectedly on the painted furniture and walls. For instance, the library mantel has a deep frieze of a procession of figures in high relief, which turn out to be the parts of speech before the Tower of Babel driven back by a figure of Grammar. The conceit is ingeniously carried out. Thus two trumpeters, male and female, lead as "the personal pronouns;" behind them is a dog for "it;" after them comes a lady as "the verb," and the pages holding her train are "the articles;" a youth and maiden represent "preposition and conjunction;" at the end is a man starting back for "interjection." These and all the other decorative figures are most graceful and of high artistic merit. The mantel of the next room is admirably sculptured with the "Romance of the Rose." Up-stairs is a mantel with "Jack and the Beanstalk." In the architect's bedroom there is such a flood of color that the ground of the furniture is scarlet, without its appearing too crude. Here fancy has been everywhere at work. Instead of shutters delicate gilded lattices of Eastern design close the windows, and the red marble basin is inlaid with silver fishes. It is this endless play of fancy and his fastidious taste which have, perhaps, kept Mr. Burges from competing more frequently for important buildings. The decoration of St. Paul's was at first confided to him; but on some interference of the committee with his ideas he promptly threw up the whole thing. He has the honor of being the only man in England who has built "a real live" cathedral, that at Cork, in the early French Gothic. His design for the Law Courts was the one most liked by the profession in general; but in the celebrated division of spoils which gave Barry the National Gallery, Waterhouse the Natural History Museum, and Street the New Law Courts, irrespective of their designs, he was left out in the cold. We can console ourselves that our competitions are hardly more unfair than those elsewhere. R.

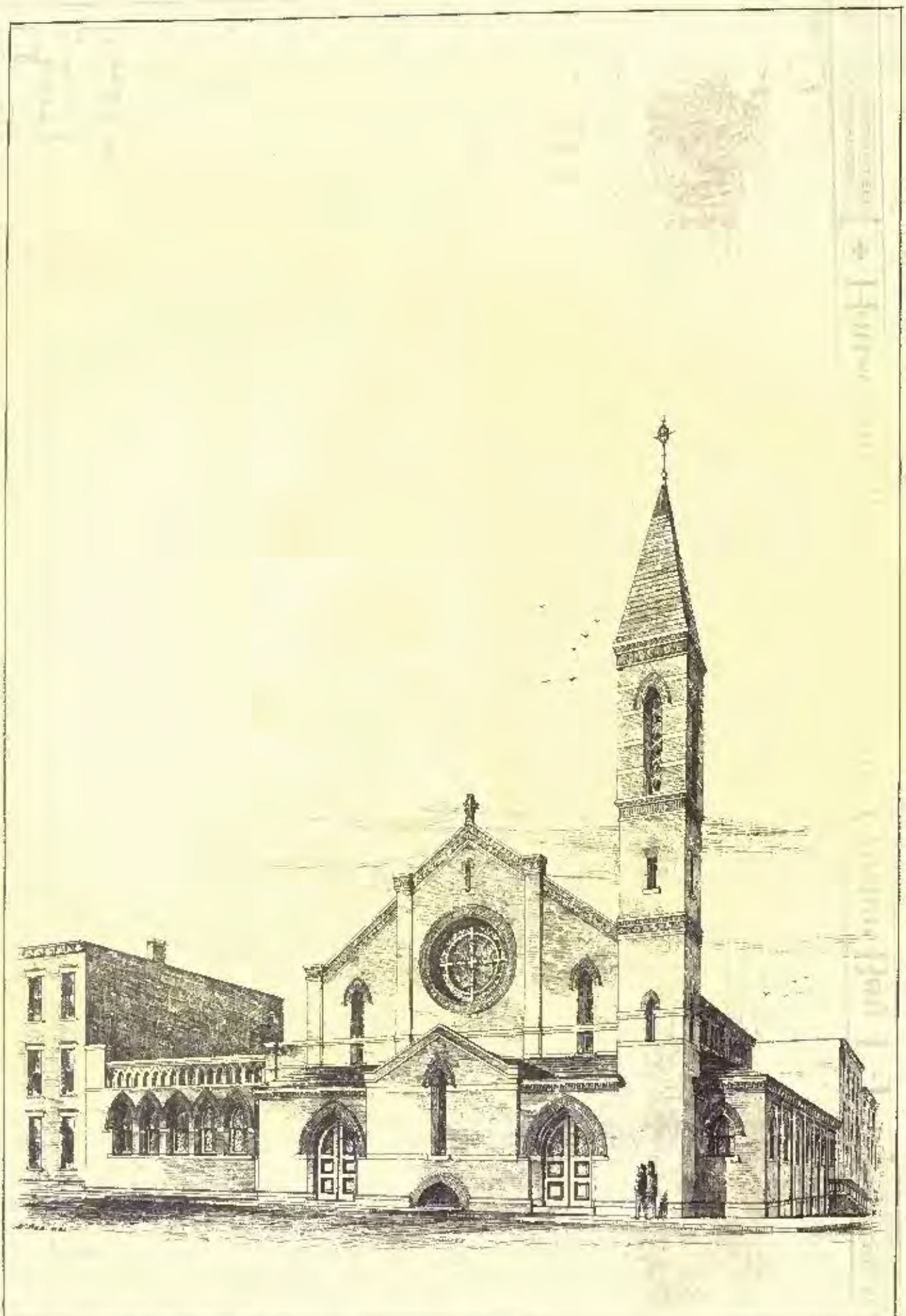
THE MASSACHUSETTS CHARITABLE MECHANIC ASSOCIATION'S EXHIBITION. II. (*Continued.*)

BOSTON.

It is good and wholesome for the home artists to see their pictures hung by the side of these masterpieces, and it is no exaggeration to say that the comparison is in many cases extremely creditable. One of the first pictures which catch the eye on entering the gallery is a noble picture of Boon Island Light, by W. F. De Haas. The French rarely paint marine subjects, I believe; at any rate we seldom see them here, — the calm, broad harbors of Ziem can scarcely be called marines, — but after the sensuous glow of Ziem's picture in the great gallery, what a healthy tonic is this of De Haas, with its dark sky and angry sea, and the fierce drive of the surf against the white shaft of the lighthouse. M. F. H. De Haas has two pictures here, of which one, No. 238, is the same for which a medal was awarded him at

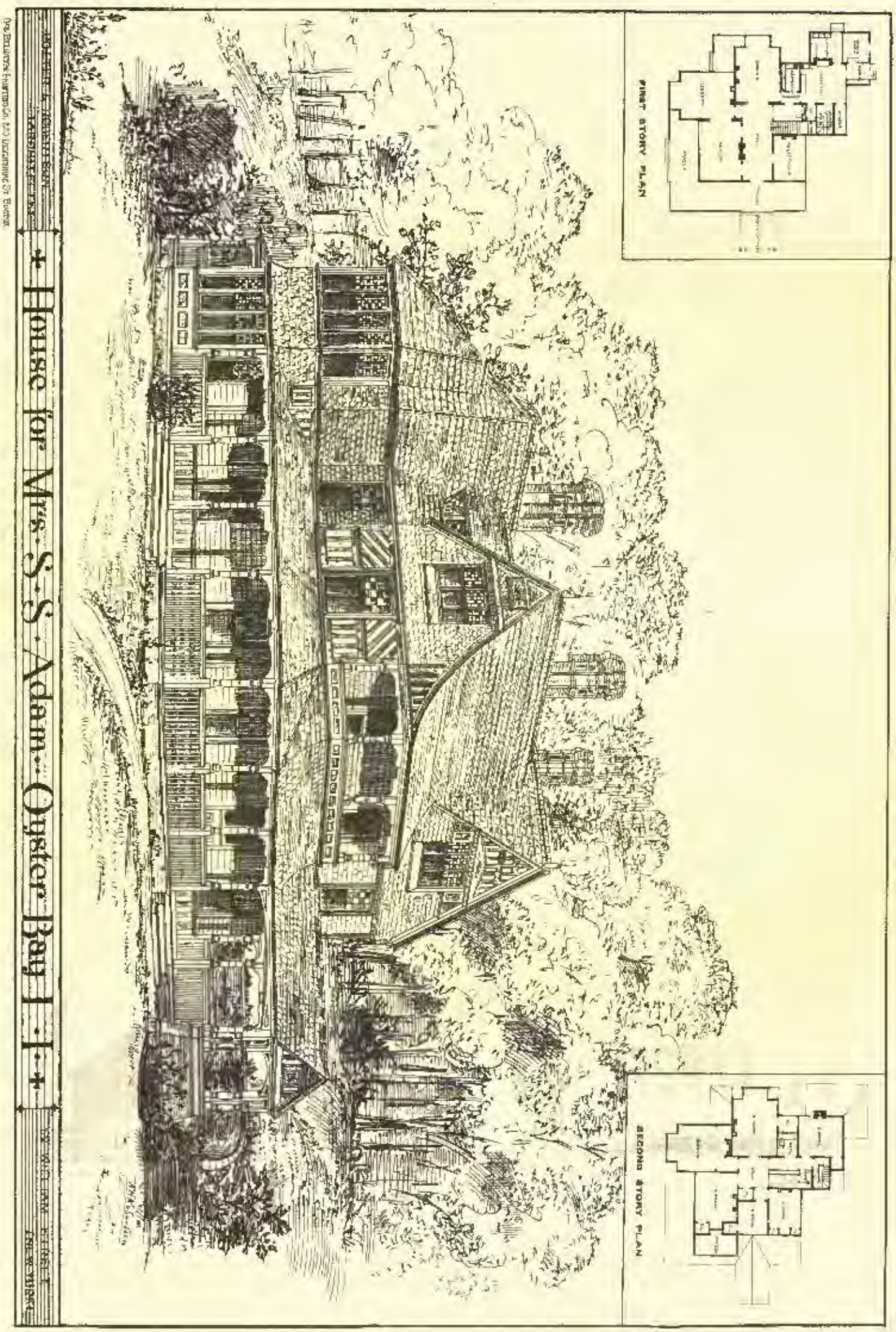


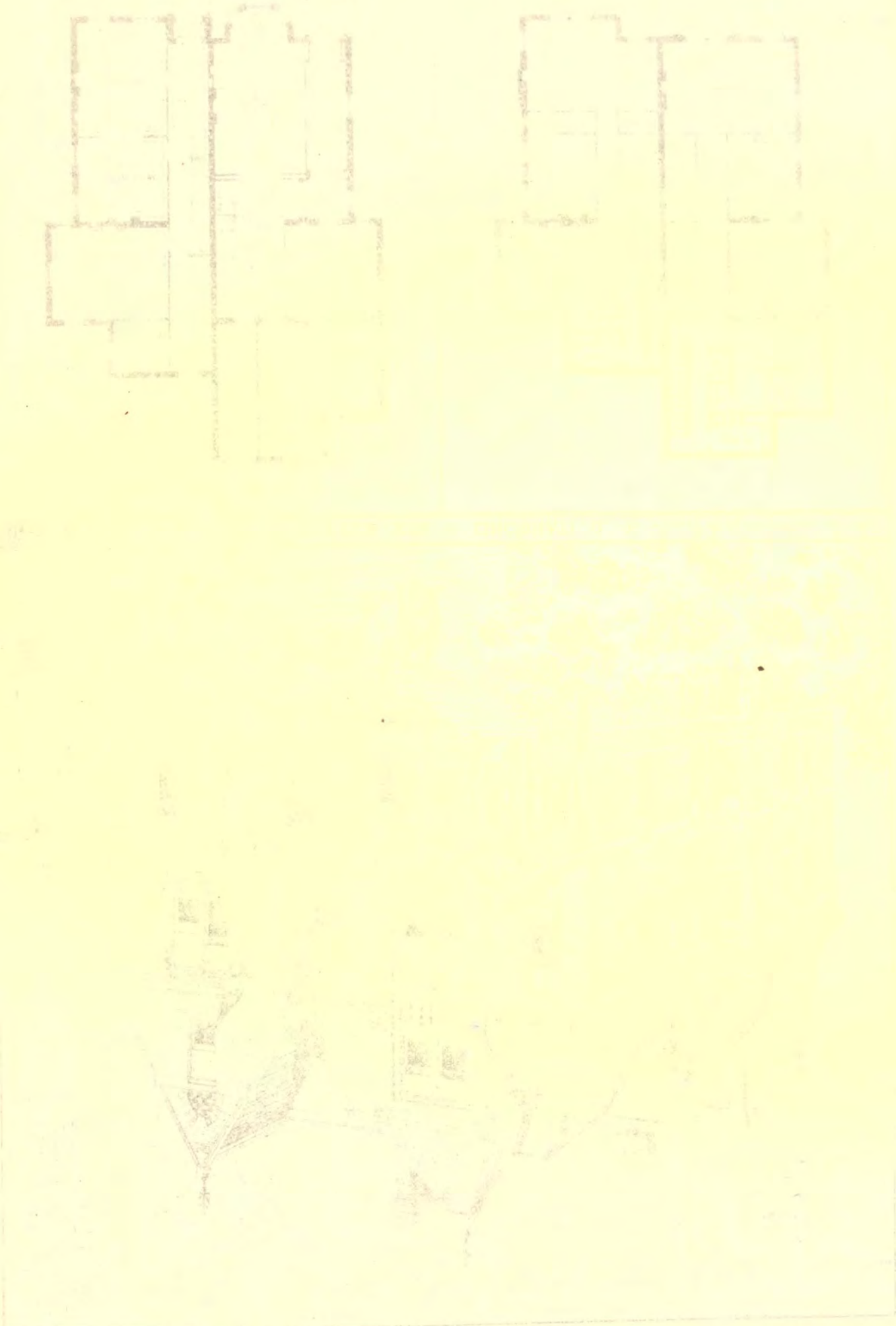
CHARTRES, FRANCE.



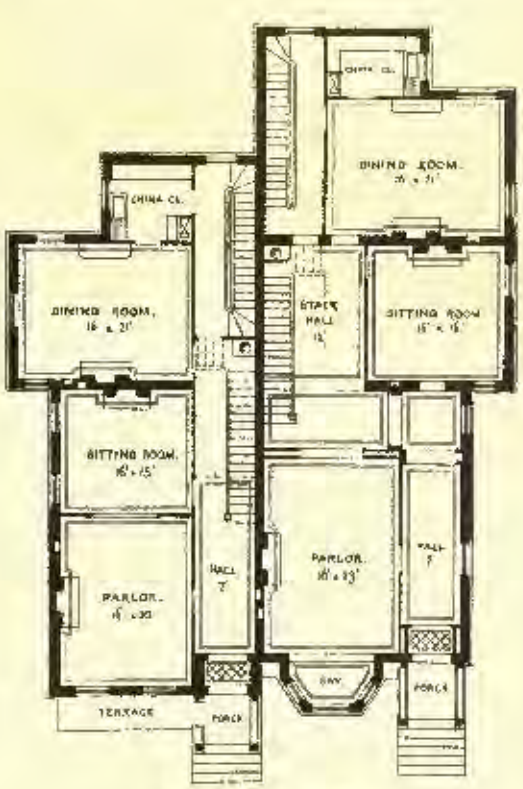
PILGRIM CHAPEL,
OF THE CHURCH OF THE PILGRIMS, REV. DR STORRS'
BROOKLYN, L.I.

J. CLEVELAND CADY, ARCH'T.
[illegible] BROADWAY, N.Y.

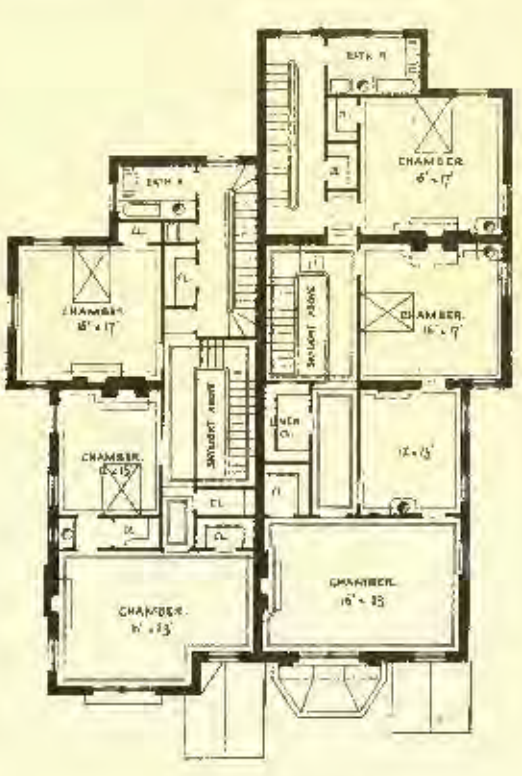

House for Mrs. S. S. Adam. Oyster Bay L. I.
FIRST STORY PLAN
SECOND STORY PLAN



HOUSES FOR JAS. A. FRAZER, ESQ. ✻ CINCINNATI, O. ✻ Jas. W. McLaughlin, Arch't.



PLAN OF FIRST FLOOR.



PLAN OF SECOND FLOOR.

THE HELIOTYPE PRINTING CO. 239 DEVONSHIRE ST. BOSTON.

the Centennial. These pictures at least cannot be charged with too great a devotion to French methods. No more can those of George Inness, who is liberally represented on these walls. His large picture of the pine grove of the Barberini Villa is here, and makes an imperative demand on the attention, with its group of sloping heads of stone pines, with its hard green turf and its cold sky, and the atmosphere of a New England March. His earlier style, as seen in 247, the end of a thunder shower, is much truer and more impressive; and his later also, as in the landscape No. 270, such a quiet view as one might see in any New England upland town, with no touch of grace added by way of idealization.

Mr. Hunt has a larger number of pictures at the fair than any other artist, and they represent a surprising variety of work, in which, singularly enough, no portrait is included. No. 254 is a noble and solemn rendering of a most poetic subject, "Harvesting at Sunset;" "the earth is dark, but the heavens are bright," and against the gloomy sky stand out, almost in silhouette, the slow oxen, with their loaded wain, toiling along the steep hillside. The charming picture of the bathers, one boy standing waist-deep in the water, and his fellow upright on his shoulders, preparing to dive, is in one of the small rooms, hung rather low, and, as it seemed to me, with not quite as good a light as it deserves. The two pictures of Niagara do not seem very successful in rendering either the grace or the majesty of the great fall, while the mad rush of the rapids above is scarcely so much as indicated.

Mrs. Darrah's fine picture, No. 212, "Gathering Kelp," hangs in what, for most pictures, would be dangerous proximity to the great group of French canvases on the east wall of the large gallery, but it is in no way put to shame by its grand neighbors. It is a very strong and masterly treatment of a difficult subject; the attempt to contrast the sombre colors of the landscape has, perhaps, led the artist to make her sky too uniformly white and cold. Mr. Appleton Brown has four pictures here, of which No. 185, a fine autumn landscape, with a great brown oak, and a plain covered with a low growth of reddening shrubs, with cold clouds drifting above, is quite in the best French manner.

M. Oudinot, a French painter who has come among us to paint and to teach, sends two pictures to this exhibition, of which No. 140 is noticeable, apart from its somewhat singular subject and its resemblance to Corot, by reason of its graceful drawing and its cool, fresh, and sweet color. It is a French country road, shown in sharp perspective, with a thin row of tall trees on the right, through which one sees some cultivated fields and a dark group of farm buildings. The spongy soil of the road, with its deep ruts filled with water, and the grass growing between, are rendered with remarkable truth and beauty, and make one desire to see more of M. Oudinot's work.

Mr. Foxcroft Cole is one of the most conscientious and successful disciples of the French school, and his pictures, of which he has some half a dozen on these walls, are faithful, intelligent, and strong, though they seem to me a little monotonous in subject and treatment, and too uniformly low in tone. The prevailing sombreness of the landscapes makes one breathe a sigh of relief when he catches sight of Mr. Addison Richard's charming little picture of Anne Hathaway's cottage, so fresh and bright and spring-like is it.

The genre painters do not gather in great numbers. Mr. J. W. Champney sends four or five pictures, of which No. 268 is a careful and minutely elaborate piece of painting, called "Lunch in the Field." Another "Lunch," by W. Shirlaw, No. 358, is amusing and clever. The sturdy little maid and her small companions are quite of one mind respecting the duty which is next their hand. In Mr. Beard's picture, No. 184, "Kicked Out," the tramp is immortalized: the inhospitable weather, the pitiless closed door, and the shrug of hard philosophy with which the poor dead-beat gathers himself together and prepares to tramp, uncertain whither, are clever in the extreme, and worthy of a better subject.

Mr. W. A. Gay is represented by three characteristic pictures, "A Coast Scene at Cohasset," a "Forest Interior," and a lovely "Nile View," wherein the foreground is a village on a high bluff, dark and strong in color, with a rude dome rising out of it into the blue sky, while below in the middle distance, the river is seen, and beyond, the distant shore, faint and gray with palm-trees. There are few architectural subjects beyond a Byzantine court-yard by Henry Leland, not very characteristic, a church interior in North Italy by Eugene Benson, with peasants worshipping, and an interior in the Hotel Cluny by our townsman, Mr. H. P. Clark.

Mr. William Bradford's "Rainbow among Icebergs" is a picture which makes a severe draft upon the faith of the beholder. One is willing to believe in the strange and exaggerated colors of the arctic scenery, but not in the solidity of the rainbow.

In one of the lower rooms is a small but interesting collection of water-colors, mostly English and American, in which there is no extraordinary work, but much that is very good. Some charming drawings of French farm and village scenery by Foxcroft Cole seem to me more interesting than his more elaborate oil-paintings. There are two or three of the exquisite drawings of Miss Bridges, in which the minute pencilling of the grasses and small flowers is carried almost to an excess of poetic delicacy.

These lower rooms form a very attractive feature of the fair. Besides the water-colors, there is a lot of *photogravures* of French pictures, contributed by Messrs. Knoedler & Co., of New York, which really need more time than one can often spare in a gallery; a large collection of heliotypes from the Heliotype Printing Company, and another of Albertypes from the Forbes Lithograph Company, which enable one to compare intelligently the results of these rival processes of reproducing engravings and drawings; a few good architectural drawings, among which I remember Mr. Clough's fine perspective of the new buildings for the Latin and English High Schools, some large and well colored perspectives by Mr. Putnam of sea-shore hotels, and a very clever sketch by Mr. Preston of the interior of the Exhibition Building; and a very creditable exhibit by the Household Art Company, of tiles, furniture, tapestry, and vases. Among which are some beautiful wall-tiles, by Minton, of a pomegranate pattern, showing the leaves, flowers, and fruit, on a ground of orange-tawny; and an upright border of tiles from Creil, of remarkable beauty, set in the jamb of a doorway. And then there are the displays of china by the great dealers, and of glassware by the Boston & Sandwich Glass Company. I said, in my last letter, that we can at present only follow the older nations in all matters of art, but we follow pretty close in glass-making, which, if not a fine art, requires at least some of the artist feeling to bring it to perfection. The glass of the Boston & Sandwich Company is exquisitely beautiful in its forms, thinness, and decoration, and some of the ruby and amber ware is superb in color. In pottery, also, Messrs. Jones, McDuffee & Stratton have included in their exhibit some of the productions of Messrs. Robertson & Co., of the Chelsea pottery (why they have not an exhibit of their own is a natural question), which in form, color, and glaze would not do discredit to Doulton himself. Some of their ware has a decoration of an incised pattern, by Fenety, of remarkable grace and originality.

A.

THE ANNUAL CONVENTION OF THE AMERICAN INSTITUTE OF ARCHITECTS. — QUARTERLY REPORT OF THE BUILDING DEPARTMENT.

NEW YORK.

THE prospects are that the Institute Convention next month will be a good working meeting, pleasant and profitable, but without any very sensational features. Messrs. Cady and Robertson, the committee of management, representing respectively the Institute and the Chapter here, have corresponded extensively with different members, and some good papers are promised. One, on Brick Architecture, will be in the very nick of time, judging from the endeavor of many of our metropolitan architects to outdo each other in erecting fantastic things in brickwork. The paper will be a sharp criticism of many of the faults, while recognizing that there is a wonderful possibility of use and beauty in this material. Another topic to be treated in a paper and thrown open to discussion is "The Faults of Modern Architecture,"— broad enough surely to give room for almost endless discussion. The essay will dwell upon the ambitious endeavors of modern designers, in every class of work, and the tetanus striving after something new; the worship of novelty for its own sake, and the general growth of an unrest in civil, religious, and domestic architecture. The sessions will be held in the Coal and Iron Exchange Building,—a building of Mr. Hunt's design, and as a piece of construction, one of the most perfect in the city. Of its design members can judge when they arrive. The sessions will last two days, closing in a dinner, and excursions to various new and prominent buildings in the city have been arranged.

The quarterly report of the Superintendent of Buildings shows a gratifying increase in the number and estimated cost of buildings erected. The quarter ended on the 30th of September, and is for the dull period of the year, but compared with the corresponding quarters of other years preceding the following table is made up:—

	1875.	1876.	1877.	1878.
Plans filed	161	100	103	154
Buildings embraced	297	315	288	344
Alterations	229	223	249	320
Buildings embraced	260	240	261	238
New buildings commenced	301	305	246	428
New buildings completed	275	280	268	325
Alterations commenced	282	293	238	270
Alterations completed	267	269	207	313
New buildings in progress	746	769	681	832
Alterations in progress	198	143	169	189

In money value the rate is sustained in favor of the quarter just passed, the figures standing:—

Third quarter.	New work.	Alterations.	Total.
1875	$3,198,870	$718,195	$3,917,355
1876	2,817,378	827,213	3,344,591
1877	2,628,175	473,634	3,102,850
1878	3,715,725	586,125	4,300,850

Of the 154 plans offered 124 were passed on first examination; 15 were sent back for alteration, and then approved; and 15 were rejected outright. The 344 buildings included are classified as follows: first-class dwellings, 135; second-class dwellings, 43; French flats, 27; tenements, 72; first-class stores, 5; second-class stores, 8; third-class stores, 8; office buildings, 4; shops, 7; churches, 2;

stables, 15; public buildings, 4; frame dwellings, 14. The churches are small buildings in the upper part of the city. During the quarter 18 buildings have been ordered to demolition, and 252 have been found out of order and made safe. No bad breakdowns have marked the quarter, though in one or two instances haste in rushing up buildings has been checked by crushed and falling walls. The great bulk of the dwelling-house work in all the classes is in the upper wards, where the rapid transit lines are pushing at a steady rate. W.

TURNER'S ETCHINGS.

Prof. C. E. Norton, of Harvard University, has recently caused to be reproduced, by the heliotype process, the series of thirty-three etchings from the plates of Turner's "Liber Studiorum," with a view to bringing them within reach of students of art, and of schools throughout the country. The reproductions are made for Professor Norton by The Heliotype Printing Company of Boston, and are executed with utmost care, all inferior impressions being rejected. As reproductions they seem to us most excellent; and to constitute one of the most important contributions which have yet been made in aid of useful instruction in drawing. The lines appear wonderfully clear and perfect throughout, and the plates seem scarcely to differ in any respect from the originals, save in regard to that embossed quality of line which the deeply bitten copper gives. But this quality, though it adds great richness and charm to the originals, is not an important one to the student. The etchings themselves are all by Turner's own hand, and consist of the leading lines of the subjects, which were afterwards realized in complete chiaroscuro, by means of mezzotint engraving. The true significance and value of these leading lines, as such, can be recognized by those only who have acquired the capacity to appreciate the qualities which make a line expressive and beautiful; and they are, therefore, like all great work, to be studied before they can be fully enjoyed. In his use of the line Turner is instinctively in accord with all the great masters and schools of past times; and this use of it is by no means confined to these plates of the "Liber Studiorum." It is constant, as a skeleton groundwork, in all his works, — from slightest sketches to highly finished drawings, and large oil-paintings. In these last it becomes effaced, indeed, in all passages where softness of misty form, and mystery of space require it; but there is scarcely a drawing or painting by him in which traces of it do not remain visible, giving firm definition to all salient points. The great mass of his notes and sketches from nature are done in pencil outline, lightly washed with water-color; the firm line and the washed color supplementing each other according to the method which, as we have said, is in perfect accord with that of all the great schools of the past, — and is correspondingly at variance with the loose methods of most modern practice. The methods of the classic schools, — Egyptian, Greek, Tuscan, and Venetian, — are, in this respect, essentially identical and invariable. Through whatever modification of national or individual peculiarity, the order of procedure is always: first, firm outline, second, color; third, chiaroscuro. In the wonderful fragments of Egyptian painting, from the walls of the tombs along the Nile, which are preserved in the British Museum, this order of procedure is perfectly distinct. In all known Greek vase-painting it is the same, so far as Greek painting goes. In early Italian art it is so precisely the same that if one of the Egyptian birds from the British Museum were placed beside one by Benozzo Gozzoli in the Riccardi Palace at Florence, or the Campo Santo of Pisa, they would appear very much like work by the same hand. And in all the Italian painting the same methods hold till the rise of the academic schools, which have reversed ancient principles, given false direction to modern practice, and crippled the artistic expression ever since. The few painters of modern and recent times, who have achieved anything of permanent excellence, have been mostly those who have eschewed the schools, studied nature for themselves, and drawn independently upon the ancient sources. Turner began to draw upon these ancient sources at a very early period in his career. The bold and careless methods of his first teachers were gradually supplanted by those which were akin to the methods of the old Florentines. In these methods, which became the basis of all his future practice, he went on steadily improving from year to year, until, in the full maturity of his powers, he was able to produce such outlines as these of the "Liber Studiorum."

Nothing, perhaps, could better contribute to the acquirement of the capacity of appreciating, not only Turner's genius, but also the fundamental qualities of all finest art, than attentive study of these reproductions. This study involves immediate reference to nature. When one has made some progress in discovering leading lines, and has become sensitive to those linear qualities which are expressive of essential characters, as, for instance, the energetic growth, elastic spring, and movement of fibre in a tree; of geologic structure, cleavage, and wearing away of a mountain, one will be likely to feel that these characters are wonderfully expressed by Turner in the character of his line; that the seemingly accidental movements of hand are graphic in the highest degree; and that in this graphic expression the economy of touch is as wonderful as any other quality. The master always knows precisely when to stop, so that each line and dot may have its utmost force and suggestiveness.

Then, beyond these graphic qualities, in which a diligent, watchful, and sensitive student may hope, in due time, to attain no mean skill himself, there will be found, in these outlines, expression of those great instincts of design which mark genius of the highest order. The faculty of dividing a space and distributing quantities beautifully, so that the design as a whole shall be felt to be beautiful, even without regard to what the lines graphically represent. A faculty to be in nowise gained by any communicable code of laws of composition; but one which, when, it exists at all, is always spontaneous and mysterious. In the results of it, laws may be discovered, to which it always works in instinctive obedience, the perception of which may increase our enjoyment, but *from* which it would never be possible to produce another beautiful thing. Turner is incomparably great as a linear draughtsman; he is great, also, as a landscape painter in all respects; but he is especially great in the quality and range of his designing faculty.

INDUSTRIAL SCIENCE DRAWING.

Mr. Warren's book[1] which is one of a series of text-books upon Descriptive Geometry and Instrumental Drawing, is an enlarged reprint of a book published five years ago, the last half of it being entirely new. The original work, if we may judge by what is here reprinted, consisted in an exposition of some of the more elementary conceptions of geometry, expanded over fifty or sixty pages of text. It may not have been without value to students approaching this study without an instructor. The first part enumerates the different ways in which straight and curved lines can be combined. The second treats of solid forms in the same spirit. The reader is then advised to draw things in isometric projection and in perspective, advancing from the geometrical solids to "knives, forks, spoons, castors, tea-sets, taps, pumps, stoves, pitchers, bowls, cups, saucers, dishes, etc.; . . . . and articles of furniture having a geometrical form, such as chests, clocks, work-boxes, book-cases, tables, desks, etc., ... and such mechanical objects as are accessible, such as railroad chairs, frogs, and switches; grindstones, hay-cutters, bridge-joints; roof-framings, as found in barns, attics, etc."

"By practice," it is added, "the learner will not only learn to make such sketches readily and neatly, which will often be a serviceable accomplishment, but will by degrees collect an album of valuable examples of construction, the exact knowledge of which may be useful." Chapter IX., on Lettering, gives the proportions of the letters of the Roman alphabet with great minuteness of detail, it being said of the letter V, for instance, that its width is just eighteen and a half sixteenths of its height, a fact which has, we may presume, hitherto escaped record.

The third part, which is entirely new, treats of the Elements of Geometric Beauty, or purports to do so. Here the writer appears to less advantage, being apparently on unfamiliar ground. One chapter is given to the three principles of "Unity, Harmony, and Freedom;" the next to the "Two Radical Geometrical Ideas of Distance and Direction," and to the numbers 2, 3, and 5, and their compounds, as found in the multiplication table. The third explains the arithmetical theory of harmony in music. The remaining forty pages are "based, in general, on the ingenious and presumably correct theory of D. R. Hay." Mr. Hay was a man of genius whose personal influence as a practical decorator is still felt on both sides of the water; and his "Principles of Symmetric Beauty" gives abundant evidence of the vigor and originality of his mind; but our author is probably the only one of his readers who was ever imposed upon for an instant by the brilliant and fantastic speculations with which it is filled. The "egg-forms, derived naturally, and in unlimited variety," which are presented in this work as an improvement upon Mr. Hay's composite ellipse, serve as the *reductio ad absurdum* of his theories.

We have before now expressed our surprise and regret that the house of Wiley and Sons should lend the weight of their name to publications like this, which darken counsel by words without wisdom. Its form is that of a scientific treatise, but it is without substance. It is not fair to the draughtsmen and artisans, teachers and students, to whom it commends itself, for them to lend a hand in bringing it into the world.

A WESTERN COMPETITION.

Milwaukee, October, 1878.

To the Editor of the American Architect:

Dear Sir, — The following notice appeared in the columns of the Milwaukee *Daily News*, the official paper of this county, on the same day it bears date.

Notice is hereby given in pursuance of a resolution of the County Board of Supervisors, of the County of Milwaukee, adopted on the 27th day of May, 1878, that plans, drawings, and specifications, including an estimate of the cost for the erection and completion of a county asylum for the care of insane and inebriate persons in and for the County of Milwaukee, for the accommodation of 250 patients, — such plans, drawings, and specifications to cover a complete building, including heating apparatus and other requisite machinery, — will be received by the Select Committee of the said Board of Supervisors on County Asylum, at the office of the County Clerk, in the Court House, in the City of Milwaukee, until the 15th day of June, 1878, at 10 o'clock, a. m. The architect whose plan shall be adopted will be employed to superintend the construction of the building, and his plan only to be paid for.

Dated, Milwaukee, May 28, 1878.

Select Committee of the County Board on County Asylum.

[1] *Industrial Science Drawing. Elements of Plane and Solid Free-Hand Geometrical Drawing, with Lettering, and some Elements of Geometrical Ornamental Design, including the Principles of Harmonic Angular Motion, etc.* For draughtsmen and artisans, and teachers and students of industrial and mechanical drawing. By S. Edward Warren, C. E. New York: John Wiley and Sons.

The time for receiving plans was afterward extended three weeks beyond the date, June 17, as per notice.

The author of each plan appeared before the select committee to give the necessary explanations and answer such questions as might be called forth during the consultations of the committee. The result was a unanimous rejection of four out of the six plans presented, and two reports were made to the board of supervisors, with reference to the two remaining plans, which resulted in the rejection of these also.

A second notice was issued through the official journal, differing not materially from the one given above, with the exception of dates. Near the 20th of September the second batch of plans was presented to the committee, three competitors only appearing. The committee, with creditable anxiety to have things all right this time, selected two experts to whom the plans were submitted, and who gave them most careful consideration. One plan out of the three was decisively rejected as being wholly unfitted for the purposes. The remaining two (being by the same two architects who were most successful in the first competition) were strongly recommended by the experts, either one being pronounced admirably calculated to carry out the best idea of an asylum for the insane. Particular points of excellence were noticed in each one, offsetting points in each that were capable of improvement, one defect simply being discovered in either. The committee were divided as before, on the merits of the two plans, but a vote of the board resulted in obtaining a majority in favor of one of them, the vote standing ten to eight. A provision in the law of the State of Wisconsin, empowering counties to build asylums, stipulates that the plans adopted by the board of supervisors must be submitted to the state board of charities, and also to the governor of the State, for approval. This has been done in the present case, and on October the fifteenth, the plans of H. C. Koch & Co. were finally adopted by the board of supervisors, who have authorized the committee to advertise for proposals for building the aforesaid asylum, and also to make a contract with H. C. Koch & Co. for the plans, specifications, and superintendence of the buildings of the proposed asylum.

This particular mention of the matter would hardly be called for, to occupy room in the *American Architect* (although a very long story is told as briefly as possible), were it not an additional evidence of the improper methods employed in obtaining plans for public buildings. The prevailing notion is — as shown in the laws which empower States, counties, and cities to levy taxes and erect public buildings — that any body of men are capable of procuring suitable plans and passing judgment upon them, whatever may be the purposes of the building for which they are intended. Until the public is educated out of such a fallacious notion, similar follies will be again and again repeated.

This board of supervisors of Milwaukee affords a fair example of the average bodies of men usually intrusted with such matters. About one half of them, in this instance, representing the townships in the county, are farmers; the remainder, representing the city, consists of two commission merchants, one picture-frame maker, one retired farmer, one retired dry-goods dealer, one sailor, and one solitary mechanic, a journeyman stone-cutter. These are all worthy men, fitted for their own callings by nature and experience, and manage the county business passably well. What private citizen, however, would intrust them with a commission to provide plans for his own buildings for any purpose? Yet our wise legislators empower these men to provide a hospital for two hundred and fifty unfortunate lunatics. Happily in this instance a combination of peculiarly fortunate circumstances have given this county the benefit of a very excellent plan, but it is questionable if after all the delays and discussions upon the merits of it, there are three men in the board who have a correct and intelligent comprehension of its essential features of adaptability for the purposes designed.

Competition may seem to be a very excellent method to those who do not compete, but its effects are pernicious in many directions upon those who do, and the results of competition generally partake more of the devilish than the divine. B.

THE CASTELLANI COLLECTION.

THE Castellani collection, recently exhibited and offered for sale in New York, was formed by an experienced gentleman with intent to dispose of it, if possible, as a whole. His price was £30,000, or $150,000. Failing to sell it as a collection, the owner offered it for sale by auction in Paris, on the 27th and 29th of May last, during the exhibition which attracted thither representatives of art lovers from all the world.

This collection is so well known here that it is unnecessary to describe its character. It was especially valuable for its fine examples of Gubbio lustred wares, having also a few renowned specimens of other fabrics. Long known to collectors, it was expected that the "fancy specimens" would elicit active competition, and they did so. While the general run of prices was greatly lower than the experienced possessor had anticipated, there was, nevertheless, a marked advance over previous sales, and the distinction of two classes which we have before indicated was remarkably demonstrated. The possessor, after deducting expenses, realized from the sale considerably less than half his price for the collection as a whole. Of the amount realized, a very large proportion came from a very small number of pieces. Our notes are based on a priced catalogue sent us by a friend who attended the sale, and whose accuracy we have no reason to doubt.

As American readers are familiar with the Metropolitan Museum of Art catalogue, and as a number of pieces were assigned in the French sale catalogue to different factories from those to which Signor Castellani had assigned them in the New York catalogue, we refer to the pieces as described in the latter. The sale included nominally 340 specimens (one or two unimportant pieces, however, seem to have been omitted from the French catalogue, and only 339 were sold); of these 138 were Gubbio lustre, and these brought just about one half the total amount realized. In round numbers the sale realized for the whole collection 406,000 francs, or say $81,000, of which Gubbio wares brought about $40,000. The average price of the Gubbio specimens was not far from $300 each. This high average was due to about seven specimens out of the 138, which brought nearly one third of the total realized for all the examples of this factory.

In the entire collection there were fifteen pieces which brought 155,000 francs out of the total of 406,000.

Possessors of the catalogue will be interested in noting these high-priced pieces, as follows: —

No.	21.	Della Robbia	4,000 francs.
"	24.	Caffaginolo	10,100 "
"	34.	"	9,200 "
"	59.	Gubbio	15,000 "
"	61.	"	15,500 "
"	62.	"	5,700 "
"	64.	"	11,500 "
"	66.	"	5,050 "
"	90.	"	4,600 "
"	116.	"	5,700 "
"	269.	Urbino	20,000 "
"	298.	"	25,000 "
"	294.	"	18,500 "
"	295.	"	
"	339.	Florentine porcelain	10,000 "

There is, notably, very little gradation between the 5,000 franc pieces and those sold for 10,000 and upwards. Deducting the seven high-priced pieces, the average price of the Gubbio specimens was not much in advance of the average in the Soulages collection.

By way of contrast with the highest, it may be interesting to note a few of the lowest prices of Gubbio lustred wares.

No.	50.	Deep dish	$46.00
"	54.	Tazza, signed by Giorgio	50.00
"	102.	Cup. St. Jerome; signed by Giorgio	42.00
"	120.	Plate Giulia	22.00
"	134.	Cup	15.00
"	158.	Scodella	12.00

It is useless to discuss or attempt to explain the arbitrary rules which guide collectors in paying high prices for some specimens of Majolica, and we repeat the warning against any attempt to estimate the value of other specimens from price catalogues. When a particular specimen has obtained a reputation as a great work, or a rare work, and comes into a sale, the mere desire to possess it as a triumph over other collectors runs it far above any just estimate of its value. There were specimens in the Castellani collection which, judged by accepted rules of beauty outside of Majolica collections, ought to have brought the highest prices, which sold for a few dollars, and other specimens, which by the same rules were monstrosities, and brought thousands of francs.

There were twenty pieces of Castel Durante wares sold, at an average of about $126. The highest price ($460) was paid for No. 190, a cup on a stand, and the lowest ($25) for a pair of Albarelli, numbers 201 and 202.

Twenty-three pieces of Caffaginolo work averaged $300. This high average was due to two plates, No. 33 and No. 34, which brought respectively $2,020 and $1,840; as much as all the other specimens together. Forty-nine pieces of Urbino ware averaged about $375. This high average was also due to two renowned specimens, No. 269, the portrait of Charles V., sold for $4,000, and No. 298, a historical basin in shape of a turtle shell, sold for $5,000, the highest price realized for any one piece in the collection. The Rouen specimens averaged about $40. The Castelli wares, ranging from $5 to $160, averaged about $72.

The most striking feature in this sale is the great advance indicated in the prices paid for what we have called "fancy specimens." The highest price paid at the Bernal sale was about $1,000, while the highest price at this sale was $5,000. This is due to the sharp rivalry among wealthy collectors, who direct their attention almost exclusively to what may be called extraordinary specimens. — *W. C. Prime in the Art Interchange.*

A NEW FORM OF METALLIC COPPER. — The existence of an allotropic modification of copper, distinct by its physical and chemical properties, has just been established by M. Schutzenberger, who has described those properties to the French Academy. — *Comptes Rendus.* The surest way of obtaining it is by electrolysis of a ten per cent solution of acetate of copper, previously boiled some minutes to expel acetic acid and render it slightly basic. Two Bunsen or three Daniell elements are used, and all rise of temperature in the bath is avoided. The electrodes, platinum negative, copper positive and larger, are arranged parallel about three to four centimetres apart. The face of the platinum next the copper is then covered with allotropic copper, while the other face receives a thinner deposit of ordinary copper. The new form has a bronze appearance, with metallic lustre, slightly rugose surface; it is brittle, and can be bruised to impalpable powder in an agate mortar. — *Engineer.*

NOTES AND CLIPPINGS.

We desire to call attention to an advertisement which will be found on page vi wherein it will be seen that our publishers give to *new* subscribers for 1879, paying before December 15, 1878, the nine numbers for November and December next.

Cincinnati Schools of Art.—The places of instruction in drawing and the various forms of art in Cincinnati seem to call for some notice in this journal, and the information may be of interest to our readers.

Drawing is taught in all the public schools, and has been for some years past. Mr. Arthur Forbriger is principal, and has four assistants, who divide their time between the various schools. There are about 2,000 scholars taking lessons in drawing. The Mechanics' Institute has classes for instruction in drawing, and is divided into five different departments, viz.: the architectural, Messrs. R. Anderson and Theodore Richter, instructors; mechanical, Messrs. E. Lietze and Geo. Wadman, instructors; artistic, Messrs. M. Gimbelin and W. R. McComas, instructors; modelling, Mr. C. L. Fetzweis, instructor; life class, Mr. C. T. Webber, instructor. At present there are enrolled for the coming session in the architectural department, 54; mechanical, 75; artistic, 46; modelling, 10; life class, 16. Total, 201. This number, no doubt, will be increased, as the school has but just opened. The whole school is under the charge of Mr. John B. Faich, as principal. Its sessions are held every Tuesday and Friday evening, from seven to nine o'clock, for four months during the winter. An admission fee of $3.00 per session is required from the scholars; not to pay the expenses of the school, since these are many times beyond the receipts, but is charged as giving to the scholars a greater incentive to activity. Drawing has lately been introduced into the night Public High School, on a very extensive scale, and is in charge of Mr. Henry Millward, Mr. Ficke, and Miss Sullivan. There are over 150 scholars enrolled for drawing alone. The scholars in this school belong to the working class, and the instructions they receive will no doubt be felt, in course of time, on the entire community. There is yet another school devoted to the study of art in all its branches, and holding both day and night sessions,—the Cincinnati School of Design, under charge of Prof. T. S. Noble, of which we have not as yet the statistics.

The Oldest House in America.—The old Horton House, at Southold, Suffolk County, N. Y., is said to be the oldest house in America, having been built by Barnabas Horton in 1630. A portion of it (the east end) was selected later for the use of the Court of Sessions in the East Riding of Yorkshire on Long Island. This Yorkshire and its Riding with the Court of Sessions were established by the Duke's Laws in March, 1665. The judge's bench remained in the house until a few years ago. The old house has recently been sold to Mr. Amos L. Sweet, who intends to take it down and build a new one on its site. The residents of Southold and its vicinity, as a fitting ending for a famous building, arranged for an evening entertainment. Antique furniture, household goods, kitchen utensils, implements of domestic industry, cranes, trammels, spinning-wheels, ancient chairs and tables, were gathered from every part of the county, and the ladies who served the tables dressed in the costumes worn two hundred years ago.

Making Pencil Marks Indelible.—Pencil marks are made indelible, says the *Papier Zeitung*, on paper prepared as follows: Any ordinary drawing paper is slightly warmed, and then rapidly and carefully laid on the surface of a bath consisting of a warmed solution of bleached colophonium in alcohol, until the entire surface is moistened. It is then dried in a current of hot air. The surface of the paper becomes smooth, but readily takes the impression of a lead pencil. In order to make the lead pencil marks indelible, the paper is warmed for a short time on a stove. This method may prove valuable for the preservation of working drawings when a lack of time will not permit the draughtsman to finish them in ink.

Cleopatra's Needle.—It is said that the total cost of setting up Cleopatra's Needle in London amounted to $75,000, of which $50,000 was given by Dorton Wilson, and $25,000 by Mr. Dixon.

Monument of William III. of Prussia.—The monument of Frederick William III., father of the German emperor, just unveiled at Cologne, is one of the largest colossal equestrian statues ever cast, being twenty-two feet high, with pedestal figures averaging from nine feet to ten feet, and commemorates the embodiment of Rhinelnd, as well as the king who accomplished it. Figures of Blucher and Kleist, Bülow, Hardenberg, Arndt, Wilhelm von Humboldt, Alexander von Humboldt, Niebuhr, Gneisenau, and others surround the granite base. The monument is the work of the Berlin sculptors Blaser and Calendrelli, weighs 76,670 pounds, and cost $112,500, which was raised by a Rhenish subscription in 1865.

Monument to Mercator.—At Duisburg, Rhenish Prussia, has lately been unveiled a memorial of Gerhardt Kremar, commonly known as "Mercator," author of "Mercator's Projection." Born of German parents in Flanders in 1512, he settled in Duisburg in 1562, and died there in 1594. The first stone of the monument was laid in 1869, but lack of funds delayed its completion.

Statue at Kiel.—A statue has been erected at Kiel to Jens Lornsen, a jurist, who was born in the Island of Sylt in 1793, and died on the banks of the Lake of Geneva in 1838. His pamphlet of 1839, advocating complete autonomy for Schleswig-Holstein, caused him dismissal from office and a year's imprisonment, after which he died a broken-hearted exile. He is now honored as the proto-martyr of Schleswig-Holstein.

Safety of Railways.—The *Annales des Ponts et Chaussées* has just published some statistics which show that a person had in France, in time of the diligences, a chance of being killed in making three hundred thousand journeys, and a chance of being hurt once in making thirty thousand. On the railways, from 1872 to 1875, the chances were reduced to one death in forty-five million of journeys, and injury in one million.

Fires in Chimneys.—At the meeting of the Société de l'Encouragement, of France, M. Pallard read a paper on Sulphide of Carbon as a Fire Extinguisher for Burning Chimneys. The products of combustion are sulphurous acid gas and carbonic acid gas; there is no necessity to plug the chimney, and the cost of the sulphide is trifling. The firemen at Paris are stated to be expert in its use, and to have used it in January last in 32 out of 51 fires; in February, in 81 out of 103 fires; in March, in 138 out of 165 fires; or in 251 out of a total of 319 fires, the extinction being almost instantaneous.

Sympathetic Explosion of Marine Torpedoes.—In a general sort of way it is known that dynamite torpedoes of from one hundred to two hundred pounds will ignite one another if sunk in ten feet of water, at intervals of three hundred feet, when one of them is exploded. Gun-cotton torpedoes are considered to be somewhat less sensitive. It is upon this fact of the communicability of ignition from torpedo to torpedo that the method of clearing a channel of torpedoes is based. A pinnace taking along a bundle of insulated electric wires starts from a vessel to the place where the torpedoes are supposed to be laid. Near the first torpedo a charge of dynamite or gun-cotton, connected to the electric wires, is dropped from the pinnace, and when the pinnace has retreated sufficiently far the charge is exploded, with the effect of discharging the sub-marine explosives in the neighborhood. Nothing very accurate has as yet been ascertained with regard to the influence of depth of water, character of the explosives, etc., upon such communicating. The experiments at Portsmouth, England, on September 3, were rather of the nature of a sham battle than a thorough test of the conditions under which a channel protected by torpedoes can be cleared and safely entered by a fleet. But, doubtless, less showy but more useful methods will, by and by, determine the exact value of torpedoes for defensive purposes.

Discovery at Olympia.—A great marble bull has been discovered at Olympia in front of the Exedra of Herodes Atticus. On it is an inscription that Regilla, the wife of Herodes, presented it for the conduit built by her husband.

Depth of Lakes.—The Bavarian *Courier* publishes an interesting comparative statement of the depth of lakes. Among European lakes the Achensee, in the Tyrol, heads the list. At some points the depth of this lake amounts to 2,500 feet. The greatest depth of the Lake of Constance is about 975 feet, that of the Chiemsee about 458 feet, and that of the Walchen and Königssee, 611 feet. The measurements made about 1870 at the Red Sea showed that at its deepest part its depth is 1,836 feet; but if we consider that the level of this lake is already 1,394 feet below the level of the Mediterranean, then we find that the total depression in the soil here amounts really to 3,230 feet. The Lake of Tiberias is extremely shallow in comparison; on its eastern part the average depth is only 26 feet, while on the western side it lies between 19 and 22 feet. In Lake Baikal depths have been found which, for a lake, are utterly astonishing. In the upper part of the lake the depth is 10,800 feet (about the height of Mount Etna), but downward the bottom constantly descends, and near the opposite bank the depth amounts to 13,200 feet. The depth far exceeds that of the Mediterranean Sea, which, at its deepest part, measures only 7,800 feet.

A Polar Balloon.—A scheme has just been proposed by M. Émile Pagan, a Belgian, for reaching the North Pole in a balloon. The aerial machine, which is of a special form, will be used as a sailing vessel as far as the eighty-fourth parallel. There he will fill his balloon, of a capacity of 2,500 cubic metres, with pure hydrogen, which he will make in the arctic regions with 14,000 cubic metres of sulphuric acid and 5,000 of iron-filings. He will be supplied with boxes of preserved meats, biscuits, bottles of brandy, alcohol, etc., which when emptied he will throw overboard as he advances toward the pole. The car will serve him, according to circumstances, as a sledge or a boat.

An Instance of English Vandalism.—An English tourist-mob has broken into the Louvre and smashed a vase. One James Olsden was in the second room of the Musée Campana, looking at the objects in terra-cotta, and enjoying the solitude of the place, when a crowd of two hundred tourists, led by a man who spoke broken English, rushed in helter-skelter. Suddenly James aforesaid heard a faint shriek, succeeded by a crash, and lo, one of the two large vases from Cyprus, between four and five feet high, which he had been admiring, had been pushed over from its pedestal, and lay in a hundred pieces on the floor. The custodian was quickly on the spot to protest against the destruction of an art treasure. This was one of those "personally conducted parties" which advertisements have commended to the public of all climes, and the cicerone was equal to the occasion. "Well, it cannot be helped, but I cannot have my party interrupted in this manner; we are already late. You know me, you know Mr. ——; send in your bill, but I won't have my party interrupted any longer." So the crowd swept on. Presently the *chef* was on the spot; he ordered the fragments to be collected in a basket, and in a few minutes a vacant pedestal was the only thing to show that a treasure which had escaped for centuries the vicissitudes in its own country, and the perils and destruction of revolution and commune in the land of its adoption, had fallen at the hands of English travellers. James followed the mob, and only heard the guide remind his people that every picture in the Salon Carré was a masterpiece, and that "that one by Murillo" had cost $25,000. Four strugglers, standing before Teniers' "Kermesse," were amused by the antics of the Dutch boors at the country fair, and the eldest of the group, in order to emphasize the remark, "By jingo, these two are having a feine time of it," actually gave the painting a rap with his walking-stick.—*The London Times.*

A Lava Bulwark.—Professor Palmieri, of Naples, is constructing a bulwark of scoria around the observatory on Mount Vesuvius, capable of offering considerable resistance to the flow of lava should it come in that direction.

An Inspector of Plumbing.—The reputable plumbers of the city of Baltimore intend to ask the city council to appoint an inspector of plumbing.

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CONTENTS.

SUMMARY: —
The Convention of the American Institute of Architects. — Express Companies and Drawings. — The Value of Chances in Competitions. — The Value of Drawings. — Waterworks and Sewers in Cincinnati. — Elevators and Inspections. — The Spinola Steam-Heating Scheme 153
ARCHITECTS AND ORGANIZATION 154
NEW HAVEN REVISITED 155
THE ILLUSTRATIONS: —
Eastern Staircase of the Hartford Capitol. — Design for a Suburban Villa. — House at Milton, Mass. — The Belgian Façade at the Paris Exhibition 156
SIR FRANCIS GRANT 157
CORRESPONDENCE: —
Letter from London. — Letter from Boston 158
THE BOSTON CHAPTER, A. I. A. 160
NOTES AND CLIPPINGS 160

THE twelfth annual convention of the American Institute of Architects will be held in New York on the 13th and 14th of this month. There will be two morning sessions and one evening session, the afternoons being taken up with excursions, visiting different buildings of special interest in the city. Besides the usual addresses, reports, and regular business, there will be a memorial address on the life and services of the late Mr. Richard Upjohn, and a variety of papers on special subjects. The resolutions submitted by the Rhode Island Chapter with regard to the liability of architects are made the subject of discussion at the first session, with papers on Commissions to investigate causes of failure in buildings, and Penalties when they are the result of culpable negligence. The other subjects for discussion are: Plumbing and Sanitary Experiments, Prevailing Faults of our Architectural Designs, and the Use and Abuse of Brick in Decoration, — fruitful topics all, and each of them sufficient to occupy a whole session, if there were time for it. The excursions will be, on the first day, to the old City Hall, the Brooklyn Suspension Bridge, and the Church of St. Augustine; on the second day to Trinity Church, for examination of the new reredos, the new court house of the Ninth Judicial District, the Church of St. Thomas, and the new Roman Catholic cathedral. On Thursday evening will be the annual dinner.

IN a new law book, Sedgwick's Cases on Damages, we see recorded a case which is interesting to architects and somewhat amusing in its inferences. It is the case of The Adams Express Co. vs. Egbert. A building committee offered a premium of five hundred dollars for a design to be submitted on a fixed day. An architect's plans, which the express company undertook to deliver, were negligently delivered so late as to be thrown out of the competition. The Pennsylvania court before which the case was tried decided that the amount of damages to which the architect was entitled was simply the value of his chance of success in the competition, and that since he could not prove any likelihood of succeeding, the value was nothing; therefore merely nominal damages were awarded. A like case which came before an English court, however, was differently decided, the court ruling that the architect, who claimed damages for the loss of his chance, should be restricted to the cost of producing his plans. Apart from the question of the merit and conflict of the two rulings, which is of some importance, it may be interesting for adventurous architects to consider the opinion which a respectable authority holds of the value of the chances for which they expend their invention and labor when they go into competitions. Whether it is good for the morals of expressmen to tell them that when by their negligence they destroy these chances they may be holden to no indemnity, is a question by itself.

FROM the architect's professional point of view it appears that the American decision is the right one in its main principle, though unreasonable in its application, and that the English one avoids the essence of the question. The loss in such cases is not of the plans, but of the opportunity of competing. Nor is the value of the opportunity any measure of the value of the plans: that an architect does not consider it to be so is shown by the fact that, although he may be willing to make them for its sake, he never thinks of exchanging them for the opportunity; that is, he never surrenders his plans in return for the privilege of competing, but retains the ownership of them unless in case of subsequent sale. The weak point in the Pennsylvania decision, it strikes us, — and the thing is worth noticing because such cases often occur, and may always occur, in competitions, — is its allowing no value to the chance of winning. In this case the chairman of the committee appears to have testified in behalf of the express company that he found the drawings unsuitable, and therefore unlikely to have been adopted; but we cannot see that the company were entitled to shield themselves from responsibility behind this opinion. The actual probability of any one competitor's winning, and therefore its value, are of course too recondite to be computed, depending on the composition of the committee, his relations to them, his personal address and influence, and possibly on the merit of his design. But the fact that it is not to be computed does not prove that it does not exist. Men buy and sell things every day whose value they cannot compute, on the strength of greater or less probability. Though we set aside the value of absolute success as beyond appraisal, there remains the value of the money recompense which is offered. Here the value of all the chances is necessarily equal to the sum of all the premiums. Then if there are a thousand dollars in premiums and ten competitors, — all the chances should be assumed, in default of knowledge, to be equal, — each chance is worth one hundred dollars plus the tenth part of the uncomputed value of success in the ultimate object of the competition. The minimum compensation, then, that should be awarded him for the sacrifice of his opportunity is the hundred dollars. If, however, there are a hundred competitors, the value of each chance is reduced to ten dollars, and the damages may fairly be called nominal. Without entering further into it, we earnestly commend this subject, and especially practice in this sort of computation, to the enterprising men of the profession.

AS for the value of architectural drawings, that is a subject which deserves attention, because it is usually misunderstood. The common impression is that their value is simply the cost of making them. Nothing can be more fallacious. It is true only of copies that may be multiplied. The original drawing of a design has a twofold value, as a record of an idea and as a manufacture. The invention embodied in it gives it its principal value; and it is worth the value of this invention added to the cost of making it. Unless the drawing is very elaborate the cost of manufacture is held to be a small part of its value; has in fact no more to do ordinarily with real value than has the engraving on the face of a bank-note. This principle is recognized in the ordinary practice which appraises a set of plans for a building, or rather their use, without any regard to the cost of making, but simply by the importance of the work which they describe. It would be impossible to make such appraisal exact, that is, special in each case; but by common consent the system has been accepted which values the record of a design, when elaborated so far as to be adequately comprehended, at one per cent of the cost of executing it, and a record complete enough for its carrying out at two and a half per cent; the value being due simply to the fact that the record is the only means of giving effect to the idea, and nobody troubling himself, in fixing the price, about the cost of making the record. If this clear, matter-of-fact view of the case could be commonly understood, it would save architects many controversies and many sacrifices.

A PAPER on the sewerage of Cincinnati, read lately before the medical society of that city by its chief engineer, contained some suggestions which cannot be comforting to the people of the Ohio and Mississippi valleys. At present these two rivers are used at once as a common water supply and a common sewer by the people who live on their banks. Twenty years ago it used to be the boast of the people on the Mississippi that its water was the best in the world; that after its sediment had deposited, the water was clearer and kept fresh longer in tanks than any other. The skeptical stranger would naturally receive this boast with a grain of allowance; whether it is still made or not we do not know. During the interval the large cities of the valleys, — Pittsburgh, Cincinnati, Louisville, St. Louis, Memphis, and New Orleans, to say nothing of the

smaller towns,— have been steadily passing their sewage into it, Cincinnati now taking all her water from it as it comes from her neighbors, and sending it on with her contribution of defilement to the cities below. If we are to accept the conclusion of the English Rivers Pollution Commission, that "there is no river in the United Kingdom long enough to secure the oxidation and destruction of any sewage that is discharged into it even at its source," the people who drink the Ohio and Mississippi water may well be uneasy. Colonel Anderson, the engineer to whose paper we refer, gives additional comfort to the people of Cincinnati by telling them that one of their sewers empties into an eddy which extends several hundred feet above the water works, so that more than once the discharge of the sewer has absolutely been traced into the reservoir. He cites an instance, which perhaps will not be so wholesomely deterrent as some. The whiskey from a burning distillery ran into the sewer, and the next morning all the people of the town recognized it at their breakfast-tables. Some of the cities, like Louisville, eschew the river water and depend upon wells, and doubtless it must ultimately come to a question of giving up the use of the water or of keeping the sewage out of it. Considering that the towns are independent of each other, and that no means but water-carriage has yet been found which satisfactorily disposes of the sewage of a large city, the latter alternative looks unpromising for the present. Meanwhile it would seem desirable to determine, by careful observations from time to time of the water and the deposits in its shoals, whether the condition of things is not growing worse.

The falling of elevators in buildings, with or without fatal effect, continues to be frequent. Two have fallen lately in New York, and within a day or two of our writing one has killed its man in Chicago. Considering how new the elevators are, and how few they have been till very lately, we cannot suppose that the tide of disaster has reached its flood. The prevailing habit of cheapening everything indicates that we may expect in due time to see them falling on all sides. The safest elevators, those in the form of a hydraulic press, have been abandoned on account of their cumbrousness and cost, and all those that are now put in are suspended in one way or another. As ropes wear or grow weak they will not be replaced in time; clutches and jawls which are not meant to be used till an accident occurs will be found out of order then; faulty running gear will betray itself and the cheap manufacturer by giving way. In New York there is an ordinance to govern the use of elevators, and owners are made responsible for injury from them, but still the accidents occur. The *Commercial Advertiser* recommends that the manufacturers who sell weak elevators, as well as the men who buy and use them, should be made responsible. This is sufficiently just, but experience shows the difficulty of fixing a responsibility which may be shared by two persons; the public safety is apt to be best provided for by placing it where it cannot be transferred, and enforcing it rigidly. As a measure of prevention, a system of careful inspection is the natural thing. Made strict enough and well enforced, it would unquestionably save many disasters; with ordinary care it would do some good, though when we consider the quality and results of inspection as it is now provided in the case of steam-boilers, for instance, or of buildings, we are not greatly encouraged.

Mayor Ely, of New York, has vetoed the ordinance in favor of the Spinola steam-heating scheme, saying in his message: "I am of opinion that no such grant or privilege should be given in the absence of experimental proof of the adaptability of the proposed system of heating to our city. If it should be proved that the proposed plan is feasible, then the privilege of carrying the system into effect, which would unquestionably be one of great value, should be disposed of after public competition in such a manner as to produce the greatest amount of revenue to the city." To resist the Spinola scheme on the ground that it is a "job," as it is accused of being, would be an intelligible thing; the actual reasons given are not very convincing. The first reason offered suggests the answer that experimental proof cannot be given till an experiment is tried; the second, that although to require a royalty may be a test of the good faith or solvency of projectors, considered as an economical scheme the proposition to levy an impost which will be made up again by a tax on the citizens is a financial juggle, and might be expected not to impose on the people of a business city.

ARCHITECTS AND ORGANIZATION.

One hears now and then among architects in the United States, scattered as they are and the greater part of them without organization, the question, What good can I get from a professional association? The question would perhaps hardly be asked excepting in a profession in which organization was not old enough and wide enough to have its benefits generally approved by experience. Other professions have found their account in keeping up their associations. The two which in the United States have made in late years most advance in technical knowledge and skill, as well as in public confidence, the engineers and the physicians, have carried on theirs with a spirit and success which ought to be strong proof to architects of their value. In our profession abroad the examples point the same way. In England, for instance, the Royal Institute and the Architectural Association contain, the one some six or seven hundred members, and the other eight hundred or more. In the United States there is no architectural society that we know of but the American Institute, and its hundred and fifty members are numerically but a small fraction of the profession. That societies should have made so little progress is natural enough in a country where the profession is so new, its standard of attainment and its lines of demarcation hardly fixed; but it is for that reason the more to be regretted, since so many things that concern the practice of the profession remain to be determined,— things of which the determination might be at once hastened and made more satisfactory by united effort.

Of the benefit to be got from association with one's professional fellows we have at different times expressed our opinion, and we shall not dwell long on it here. As a matter of business, the direct advantage of any society depends upon what its standing is, that is, upon the quality of its membership. Indirectly, every member and indeed every outsider of the same vocation feels, or at least uses, in his practice the advantage of every successful movement of such a society to establish public confidence in his profession and define its usages. There are no architects in the country whose practice is not made easier by what the American Institute has done to fix in our chief cities the proper relation of architects to the public and to their clients; to make known their proper function, their legal rights, and their due recompense. Its efficacy in this respect has led to its being accused, unjustly enough, of being a trade's-union.

But the business advantage of association is not its best side. The interchange of knowledge or experience, the stimulus of common intercourse, and the fruits of common deliberation are worth a great deal more. The more a profession is advancing, the more new problems it has to solve, the more valuable these things are. In architecture especially, where forms, processes, and materials are constantly changing, where, as with us, the best of professional attainment is constantly rising, and needs to rise, free intercommunication is most important. There are various means of such intercommunication, but none which are more efficient, none of which the energy can be more effectively pointed to any desirable mark, than organized societies. They are the meeting ground of men of varied special experience, of the old and the young practitioner; they may be the exchanges for a great fund of important technical knowledge, and directors in the investigation of the chief problems of our work. In this they depend, to be sure, altogether on what their members choose to bring to them. Hence a good way to judge of their use is to consider what one has to give. There are not many professional men so modest as to be willing to say that their experience is of no value to others; we may infer that there are not many whose arrogance or perverseness will encourage them to decide that the experience of others is not in its turn of value to them.

This leads to a different, and it may be a less selfish view of the matter. Instead of inquiring too curiously what he shall get, one may reasonably ask what he can accomplish, by professional association. The answers will be almost as many as the questions. He must be a man of narrow aims to whom his profession suggests no objects that cannot be attained within his own office or among his own *clientèle*. There are certain general interests that every professional man may be expected to wish to advance: the proper standing and respect of his profession with the public, its purification from unworthy practices, a high standard of technical excellence and of upright dealing among its members, the means of bringing its due influence to bear whenever there arises a question which it is concerned to decide, or a doctrine to promulgate, or a public movement to

forward. And almost every active-minded practitioner will have some matter of professional study or of practical bearing, which circumstance or taste has made of special interest to him, and on which his contribution to the general knowledge will be of value to his fellows; some idea or action to enforce, in which his assistance will be of importance to them, or theirs to him. The tendency of the day to specialism, the fact that in most professions the whole range of acquirement is too wide for any single person to compass, still less to increase, make the interchange of ideas and the combination of effort the more important.

These two views suggest the two chief reasons why there has hitherto been so little serious coöperation among architects in the United States. The first is a want of appreciation of the real objects of association and the benefits to be derived from it. This may be trusted to disappear with experience as the profession gains consistency, and as architects come to feel more persuasively what they all know at bottom, that the interests of the whole body of them are really the same, and that many of these can be greatly advanced by concert. The rapidity with which it will disappear must depend greatly on the wisdom and enterprise with which those who are already associated together make use of their opportunities. The second cause, and, we fear, the more obstinate, is a want of general professional interest and of public spirit among architects. The circumstances of their practice tend to maintain a business rivalry among them; and business rivalry is one of the things most hostile to concert. It is increased greatly by the method most in favor of selecting architects for work of importance, the method of competitions, a method which is unknown in other professions, except in a modified form among the clergy. The private and underhand rivalries which disfigure architectural practice are more disintegrating still. These disruptive elements make it the more desirable to foster every wholesome means of encouraging professional intercourse and keeping down a kind of antagonism which is the seed of most of the abuses of our calling. It is the praise of a professional life that it gives men something a little nobler than pecuniary success or personal aggrandizement to spend their energies upon. It is the province of an artist especially to go beyond his own private work and to interest himself heartily in the work of his fellows and whatever concerns the progress of his art. A little less of the habit of selfish isolation and a little more of a manly interest in the general well-being of their profession would be an excellent leaven for the body of our architects. To such an interest professional association is at once a stimulus and an opportunity.

We may therefore fairly recommend to architects who are doubtful whether they can secure any benefit from a professional society, and who consequently have joined in none, to take up the correlative question, and inquire whether they cannot do some good by uniting with their fellows. We may assume it to require no proof that men whose occupation is the same have the same interests, and that common interests are best forwarded by common effort. There are things enough to be done before the position of architects, and their relation to the public and their clients, will be fully and uniformly established the country over. There are points of practice and professional relations among themselves to be settled. An unlimited amount of work can be spent to advantage in a common study of professional problems which are continually occurring, and always will occur with the progress of architecture and the changing wants of the public, problems of which no one practitioner can hope to reach the best solutions, or even adequate ones. To encourage a right tone in the profession, to raise the standard of its acquirement and the technical and artistic character of its work, to give it wholesome and efficient influence where its influence ought to be felt; these things are in the special province of professional societies. Even the architect who has no desire but to secure work and to get through it successfully cannot afford to dispense with the advantage which the general welfare of his profession may afford; but we may take it for granted that to every professional man, after he has given his chief energy to his own business, there shall still be left some residuum of interest and activity for this general welfare.

NEW HAVEN REVISITED.

THIS is one of those American cities which are constantly growing in architectural interest, and may always be revisited with satisfaction. Upon returning after a prolonged absence one is impressed with the thought that the great question as to whether New Haven is Yale College or Yale College is New Haven is as far from solution as ever; and as long as this supposed rivalry goes on we may safely look for a higher development of both, and be thankful that it remains an open question. For a time, while the college, or university as they like to call it now, was in a condition of comfortable repose, grinding over its old traditions from year to year and scorning any intrusion of progressive ideas, great manufacturing interests arose about it and New Haven became wealthy, while Yale planted ivies around her Tudor library. Then the wealth of New Haven began to flow into the college treasury, and she awoke from her slumber. Sheffield, Street, and others became her benefactors; Dwight turned in the wealth of Rhode Island looms, and thus capital paid tribute to learning. Yale began to shine with new departments and new architecture. But soon manufactures declined. The crisis of 1873 was almost a death-blow to New Haven industries. But Yale continued to rear her stately edifices. Architecturally considered she leads the contest.

New Haven may fairly claim a share of the interest which attaches to whatever we have of old American architecture, now rapidly passing from sight everywhere. Some of the old houses of the eighteenth century are still in good preservation, and it is not unusual to find good examples of that sort of finely-moulded and carved wood-work which was so extensively employed in New York, and which an English writer in *Loudon's Magazine* for 1838 said must have been due to the fact that a great deal of the inside work of New York houses of the last century was done by ship joiners. These old New Haven houses are models of good workmanship. They are plain brick structures in which but little stone is employed, while the decorative treatment is confined to the wood-work both of the exterior and interior. Some of them have projecting pediments on the front, supported by attenuated columns of solid wood reaching to the roof, and often decorated with the details of the Roman Doric order, but having nothing in common with its proportions. Two of the well-known churches on the green are of similar style and workmanship also, reminding one of the style so long practised by Wren.

New Haven also partook of the classic revival which left its impress everywhere, mostly in boards and stucco, and seldom in stone or marble, during the first part of the present century. Fortunately New Haven got only the boards and stucco; and as these are rapidly disappearing probably no one after this generation will be afflicted with them. Here lived one of the few known and recognized American architects of the early part of this century, with whom, for want of better ones, we associate the past glories of American architecture. This was Ithiel Town, the contemporary of Latrobe, Strickland, Haviland, and the still surviving Davis. He built numerous dwellings here, including that one occupied by Mr. Sheffield, and the State Capitol, now abandoned forever, and falling rapidly into decay and ruin. But his work was not confined to his own city. He was associated with Davis in the erection of the New York University, one of the first attempts to introduce the Tudor Gothic, and other buildings in New York and elsewhere.

The architecture of the old college buildings is on the model recommended by Professor Huxley. The "intelligent bricklayer" here had full swing and sway without the interference of impertinent and intermeddling architects. Coming down to comparatively modern times we find that the college had advanced beyond Professor Huxley's architectural ideas, and erected two buildings in the so-called Gothic style,—having insides and outsides corresponding one to the other. These must have been put up about thirty years ago. They are the Library and Alumni Hall. The former is in the style laid down in the books of the day as "Tudor," and also portrays one of those original features peculiar to Yale College architecture, which might be called the "truncated" style. This is the omission of the stone pinnacles all around the building. But with a due regard to the feelings of those who might have occasion to look at the building, models of the larger turret terminations in wood have been set up, to show what they might be if made of stone. The other building, known as Alumni Hall, but famous as the place for holding the biennial examinations, is in the same style, castellated. In this case, however, a full-sized model of the proposed machicolations and crenellations of the curtain and four great towers has been set upon the stone walls. The opportunity thus afforded for archæological study is such as is not to be had in other similar institutions. This system of instruction has, however, been discontinued of late. Students of architecture and archæology in the new department of Professor Weir are obliged to get the necessary information on these subjects from plates and small scale models. The illustration of the "truncated" style is therefore not interfered with, as it has been seen for ten years on the turrets of the Art Building, and is now more fully exemplified in those of the new chapel.

The college seems to have been in danger of falling into an architectural rut, until the Art Building was erected in 1864. This rut was the Tudor style, supposed to have been coördinate with scholarship, learning, and monastic mystification. With its freedom from precedent, and evident adaptation to a purpose, it seems to have commenced a new era of college architecture at New Haven. No buildings had been erected or contemplated for a number of years. The gift of Mr. Street was a surprise and an innovation. It was not only a new building but a new department of study. It was natural, therefore, that it should result in a new architecture.

With the erection of this building the record of Yale's architectural progress begins. The building itself looks as fresh and new as the day on which it was completed, or rather occupied; for its unfinished turrets cry aloud for architect and builder to come back and finish them. An unsightly coat of white paint on the great skylights makes the roof hideous to behold. This has been resorted to because the inside ground glass ceilings were never completed. Steam and water have been lately introduced under the energetic management of Professor Weir. The Ghiberti gates and other interesting models have been set up within, while the professor has started an art library which appeals to all friends of Yale to come forth and help fill the shelves of the cosy and artistically decorated room which he has fitted up.

After the Art Building was completed no additions were made to the college buildings for several years. But the seed has brought forth good fruit, and the last half dozen years have witnessed the erection of two dormitories, Farnham and Durfee, two dormitories and a chapel for the divinity school, a large addition to the Sheffield Scientific School, the Peabody Museum of Natural History, and the new college chapel, besides two new buildings for the secret societies. The new boat-house, as a legitimate nursling of the university, might also be counted in the list. The record of Yale's progress is a truly noble one, characterized as it has been by an advance no less remarkable in other directions than the encouragement of architecture pure and simple. It seems strange to hear that up to ten years ago Yale College had protested against all systems of sanitary drainage, and that the introduction of water in one of its buildings was resented as an innovation. These things must be known in order to properly estimate the strides she has taken.

Farnham dormitory, the first of the proposed front tier of buildings with rear on College Street and front on the imaginary quadrangle, is a building which shows what can be done with common brick and blue stone. This would be a good place for Professor Huxley to begin his architectural studies. Here he can see what his "intelligent bricklayer" can do, with some one to stand by and show him how to do it. Moulded bricks are here used, the first employed to any great extent since the decadence of brick architecture in America. If any one doubts this decadence let him look at the base mouldings of two of the oldest dormitories here, at Carpenter's Hall, Philadelphia, with moulded base and wall laid with Flemish bond, every header being a black glazed brick, and at the cornices of a hundred buildings in Washington and Baltimore, all of which are executed in moulded, carved, or enamelled brick. But in spite of much good detail Farnham is a gloomy building, and it was hardly wise to build its large though picturesque dormer windows of wood. Public opinion pronounces the other new dormitory, also by Mr. Sturgis of New York, to be the best of the two. There seems hardly to be a foothold for adverse criticism of this building. It will be a long time before the quiet dignity of its roof and chimneys will be surpassed anywhere. The new chapel, which stands at the corner of the quadrangle, joining the two last-mentioned buildings in a group of three, has just been completed, except that its unfinished towers have joined the chorus of those on the Art Building with sympathetic wail, keeping time on windy nights with the moan of the condemned elms on College Street standing in line west of Farnham Hall. As Mr. Sturgis did not design the chapel until after the first two buildings had been completed, he can hardly be blamed for the incongruity of the entire grouping. The Farnham building seems to have been built with the intention either of extending it or abutting another building against it, perhaps the chapel itself, for it had a rough brick wall on that end. The Durfee building was built on a higher grade, indicating some change of the general scheme. The chapel most resembles Durfee in materials and design, yet it does not touch it, while it is put in juxtaposition with Farnham and on the same grade as Durfee. This involved the necessity of raising the water table of Farnham to grade, and shortening its basement windows. There is no resemblance or composition in the grouping of the brick Farnham with the stone chapel. The crowning feature of all these incongruities is that the apse of the chapel is towards College Street, the front is within ten feet of Durfee, and half the side abuts against Farnsworth. Hence, though it has no frontage proper on the streets, only a half of one side can be seen from the quadrangle, and only one of the four doors, the effect being meagre and unpicturesque. The only point of view from which the whole can be seen is the opposite street corner, practically in the rear. Thus this building, best in detail of all that the college has erected, and that whose object claims for it the grandest site, is pushed off to the corner and suffocated before it is born. In spite of these misfortunes the detail and part renderings are such only as could have proceeded from the hand of Mr. Babb, Mr. Sturgis's accomplished assistant in the work. The bad location could not prevent Mr. Babb from making one of the most beautiful interiors to be found in the whole range of modern American church architecture. The windows, with one or two exceptions, are cut-and-out Cathedral mosaic work, without paint or enamel; the decoration is well balanced in its coloring and has the true symphonic treatment. The interior woodwork is the most noticeable feature, inasmuch as it reflects the prevailing tendency toward a revival of the eighteenth century style and workmanship; but the whole designing is so tempered as to be free from the affections of the Queen Anne school. The visitor lingers long in this charming interior, and is loath to go; but other things attract our attention.

There is the Peabody Museum, fresh with its finishing touches, or at least so much of it as we will see for the next twenty years or so; for the great scheme is to cover the whole block on High Street from Elm to the next corner west. What we see now is one wing with a high hipped roof only broken by gabled windows of brick and stone. What appears to be a wing to this structure is only the connecting portion which is to join it to the great central building which is to be. Already the wing just built overtops all the other college buildings. The style, as in all the other new college buildings, is in the advanced Gothic, the materials brick and stone. The architect has introduced considerable buff brick, and the polychromatic treatment prevails throughout the exterior to a greater degree than in any of the other college buildings which have been mentioned. The architect, Mr. Cady, of New York, has given this building a grand entrance, which is the most elaborate piece of work done for the college. The interior is plainly treated throughout, except the entrance hall and grand stairway, which are faced throughout with brick of various colors arranged as a wainscot following the line of the stairs. The stairway is of cast-iron and about as good as it could well be in that material. There is some excellent painted glass, especially about the main entrance, and in the traceried heads of the first story windows.

Three years ago Mr. Cady completed a building for the Sheffield Scientific School adjoining the main building. This was quite an innovation in its way, and being faced with buff and red bricks used in ornamental patterns, with its high, round-headed windows and machicolated cornice, has a decidedly Lombardic effect. The contrast to the adjoining buildings is startling.

The new divinity school, by R. M. Hunt, has received the accession of a new dormitory, similar in style to the old one. The entrances to the stairways are from a cloister which is decidedly original in treatment, running the whole length of the building. Mr. Hunt's Moresque building for the Scroll and Key Society is a prominent landmark among buildings of its class.

There are no new college buildings in progress, nor are any new ones now contemplated. When the turrets, iron crestings and finials, and mosaic inlays, originally contemplated for the Art Building, and the real stone spires of the chapel are completed there will be time enough left still to complete the "great quadrangle," so long dreamed of. But even without these we may be content that Yale has done her full share of good work in the revival of architecture, so much in fact as to fully exonerate her from the charge of tardiness at the beginning.

But, as was said at first, Yale College is not all of New Haven. She is only half of it, and there is some good architecture in this goodly city, which is not within her classic precincts. However, the influence of the college architecture is not to be questioned. Until the Art Building was erected, New Haven could not boast one artistic structure. She had a stereotype post-office building, and many others noted for weight rather than beauty. She had a new city hall, which, with a picturesque outline and a pleasing color effect, was a most extraordinary and incongruous thing in detail. It was the simple but earnest effort of the untutored mind to fathom the mysteries of Gothic architecture. Since then an extension to it by Mr. Brown, of New Haven, has been built in much better style. New Haven also rejoices in a good, new, and practical police building, by Mr. Russell. She would not be complete, being so near Hartford, without a great insurance building. This is supplied by an immense granite structure, on Chapel Street, opposite to the green, built of the regulation granite with the proper proportion of polished columns and galvanized iron top of dizzy height, and designed in the life insurance style of architecture. Of course it does not pay. The visitor going up Chapel Street sees another new building; this time a bank, in the regulation bank style, with many flat quoins at the angles and galvanized iron finish at top. Besides these he will see two business buildings on either side of the street, wherein color effects of varied stone with touch incised carving may be seen. These are Gothic, after the manner of Mr. Brown, of New Haven. He will see that Trinity Church, now getting venerable, has a new pyramidal spire, with gilded iron crockets running up the hips and iron cross on top. If he goes inside he can see how finely an old style carpenter's Gothic church can be decorated and refitted, especially if directed and designed by a gentleman with the taste of Mr. Littell, of New York.

One of the most pleasant things in the world is to take a stroll up Hillhouse Avenue, New Haven. Another time I may tell how I enjoyed it.

W.

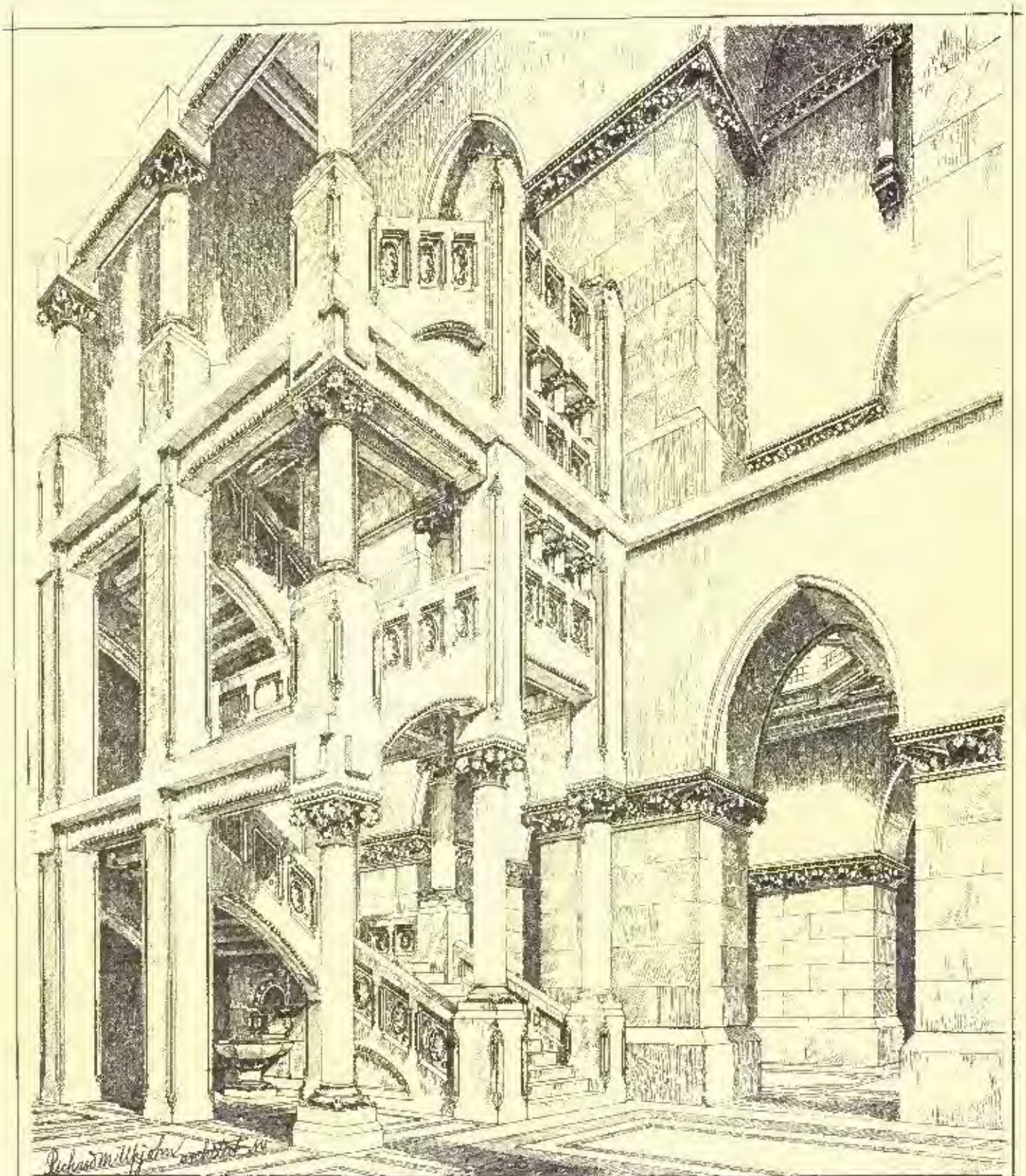
THE ILLUSTRATIONS.

THE EASTERN STAIRCASE AND DOME PIERS OF THE CAPITOL, HARTFORD, CONN. MR. R. M. UPJOHN, ARCHITECT, NEW YORK.

The staircases of the capitol are made of white marble with granite steps and platforms; the shafts of the columns are of polished red granite; the piers of the dome are of granite, with caps of marble.

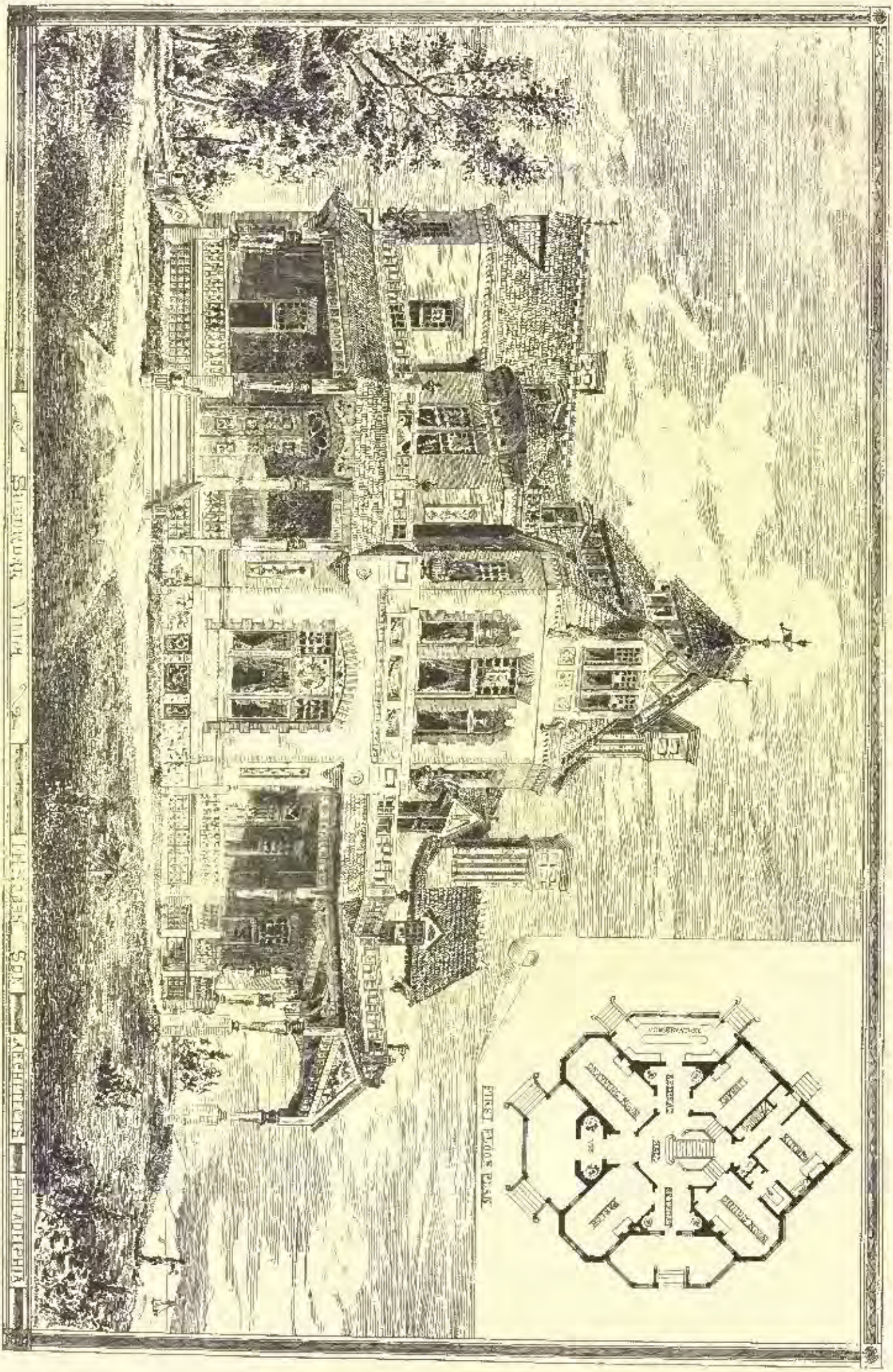
DESIGN FOR A SUBURBAN VILLA. MESSRS. I. H. HOBBS AND SON, ARCHITECTS, PHILADELPHIA.

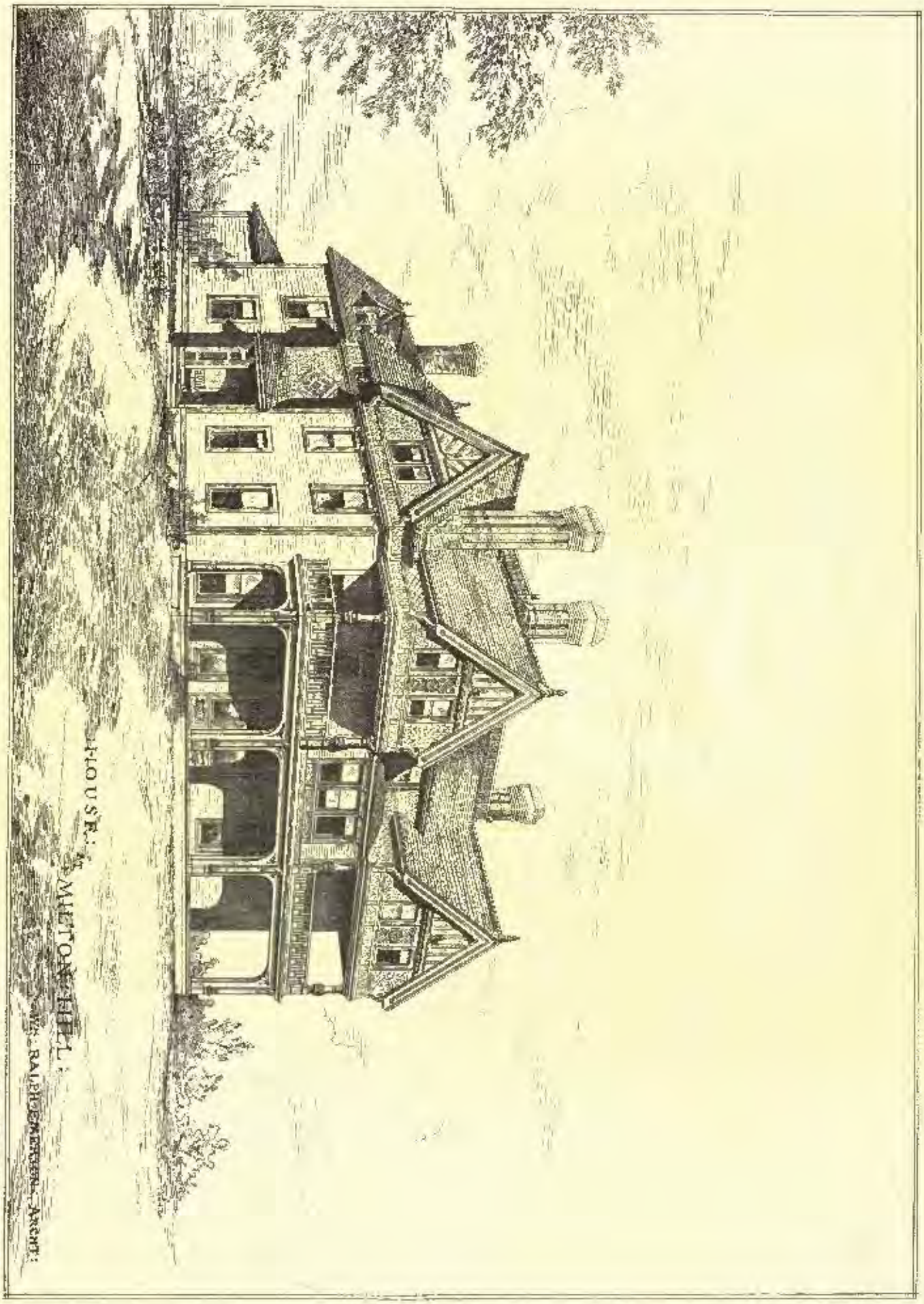
The following extract from the architects' letter will serve as a description: "The plan was organized for Mr. Wooster, of Albany,



EAST STAIRCASE AND DOME PIERS, HARTFORD CAPITOL.

THE HELIOTYPE PRINTING CO. 330 DEVONSHIRE ST. BOSTON


SUBURBAN VILLA
MESSRS. SON ARCHITECTS PHILADELPHIA
FIRST FLOOR PLAN



The Heliotype Printing Co. 220 Devonshire St. Boston

THE BELGIAN TRADE AT THE PARIS EXHIBITION.

N. Y. The design was organized for a gentleman in Boston, and will probably be built, with a few alterations, near that city. It is not necessarily an expensive building, as while it has great variety in outlines it possesses much economy in construction, and the grandeur of interior effect is of the highest order. We have reliable estimates for its construction for $20,000 by competent builders."

HOUSE AT MILTON, MASS. MR. W. R. EMERSON, ARCHITECT, BOSTON.

This house is being remodelled for Mr. John Bancroft, as is here shown.

THE BELGIAN FAÇADE AT THE PARIS EXHIBITION. M. JANLET, ARCHITECT.

We reproduce to-day from *La Semaine des Constructeurs* two designs which taken together show the façade of the Belgian section on the Street of the Nations. In this structure the materials used are all real, colored granites and marbles being used for the skeleton of the work and for the sculptured features, while brick is used as the main material. The central feature is the main entrance, a full centered archway, the voussoirs of whose arch bear the painted coats-of-arms of the chief Belgian cities. Across the upper part of the archway, at the level of the impost, is carried a wooden balcony which connects the second stories of the two wings. The engaged columns which divide from one another the windows above are of colored marble with gilded capitals. The Belgian arms crown the whole feature. This central archway is flanked by two pavilions which project slightly before it. On either side of the pavilions are two-story galleries, the upper story being an open loggia. The capitals of the different colored marble columns are all of polished black marble. The façade finishes on the left in a tower which somewhat resembles the old Flemish towers. Corresponding to this, on the other side, is another projecting pavilion, whose distinguishing feature is a projecting wooden balcony. Beyond this, again, the façade is continued in a wing whose architectural character is more unpretending.

SIR FRANCIS GRANT.

THE death of the President of the Royal Academy at the goodly age of seventy-five creates little surprise, though it naturally moves to concern and speculation. Sir Francis Grant has for more than twelve years ruled the world of art. His rise had been rapid; he was elected Associate in 1842, Academician in 1851, President in 1866. Artists, like the rest of mankind, may owe high position to native talent or to happy accident; perhaps the elevation of Sir Francis may have been due to both. Reverting to the past history of the Academy, we find that Sir Joshua Reynolds became first president by the supremacy of his genius; then Sir Benjamin West is said to have obtained favor by "his extreme courtesy and natural dignity of manner;" again, Sir Thomas Lawrence deserved to be popular, because from "the moment of his election he determined to win all hearts." Sir Martin Shee was deemed so fitted for the post that he had but two dissentients, and one of them, Leslie, — who, with Collins, had voted for Wilkie, — afterwards declared that Sir Martin made "an incomparable president." More recently Sir Charles Eastlake is supposed to have secured unanimity by his rare and evenly-balanced qualifications. On the death of Sir Charles Eastlake the first choice of the Academicians fell on Sir Edwin Landseer; but on his declining the honor, a substitute had to be found. Francis Grant, nothing loath to assume the duties with the dignities of the post, was thought to be the right man in the right place by reason of his address, his presence, and his social position; in short, no one could compete with him as master of the ceremonies. This brief review of the past shows that few public bodies have been so fortunate as the Academy in the selection of their chiefs. The six successive presidents appear to have clung lovingly to office; they all died in harness. Among the returns for their onerous labors there seems to have been reckoned a stately burial in St. Paul's. The first three presidents, Reynolds, West, and Lawrence, were so honored. Shee, as a Roman Catholic, found interment elsewhere. Sir Charles Eastlake was buried at Kensal Green, his widow, however, stating, "I declined a public funeral in St. Paul's Cathedral as not consonant with his wishes." Sir Francis Grant is buried to-day at Melton Mobray, in accordance with his own desire.

The career of Sir Francis Grant, though hardly affording incident or art material for a distinct biography, has lain a little out of the ordinary routine. The future president, born in 1803, was the younger son of the laird of Kilgraston in Perthshire, the elder scion of the house being the late General Sir Hope Grant. Francis was brought up to the bar, but, disliking the profession, he took to painting at the comparatively late age of twenty-four years. His early attainments must have been of the slightest, as little is heard of his receiving tuition beyond twelve lessons in the human figure. But society rather than study was the ladder by which the youth mounted to fame. He had the happy gift of making friends, and among his helpful acquaintances was Sir Walter Scott, who sat to him for a portrait while the tyro artist of seven-and-twenty was still on his trial. Scott in his diary tells that Grant was well pleased with his success in the full length figure seated at a table, with two noble staghounds on the right, and old armor in the background. Scott adds, "The dogs set charmingly; but the picture took up some time." It is evident that in those early days the artist had not acquired his facile sleight of hand. In the diary of the same year (1831) Sir Walter jots down the following particulars about his friend; —

"In youth Francis Grant was passionately fond of fox-hunting and other sports; he had also a strong passion for painting, and made a little collection. As he had sense enough to feel that a younger brother's fortune would not last long under the expenses of a good stud and a rare collection of *chefs-d'œuvre*, he used to avow his intention to spend his patrimony, about £10,000, and then again to make his fortune by the law. The first he soon accomplished. But the law is not a profession so easily acquired; nor did Frank's talent lie in that direction. His passion for painting turned out better. I am no judge of painting; but I am conscious that Francis Grant possesses, with much cleverness, a sense of duty derived from the best source, — that is, the observation of really good society. His former acquaintances render his immediate entrance into business completely secure. He has confidence in his own powers, — always requisite for a young gentleman trying things of this sort, whose aristocratic pretensions must be envied."

The above extract serves as a key to the painter's career. "The expenses of a good stud" drove "a younger brother" precipitately into portrait-painting. Youth had been spent in vain upon the law, for which neither talent nor inclination was found, and then precious years of manhood, passed in the hunting-field, were devoted to the casting to the winds of a small family fortune. It is not unnatural to ask where could be found the opportunity, under such circumstances, for the study of the history, the principles, and the practice of art? Well might the "aristocratic president," when addressing the students in the Academy, look with envy on their superior advantages and their timely industry. We remember the time when the future president, still on his probation, was bucked by flatterers who called up for the occasion the axiom, "Only a gentleman can paint a gentleman." Critics asked, by way of retort, Where is the artist, when the gentleman is found never to have learned to draw or paint? Sir Francis Grant had little fellowship with criticism or literature in any form, and he is known to have warned the students in the strongest terms against what he conceived to be the injurious power of the press in matters of art.

A fashionable portrait-painter has not much need of studying the internal anatomy of the human body, and Sir Francis Grant did not care to expend time and trouble without adequate return. More to his purpose was costume and drapery; he dressed well himself, and his sitters were always set off to advantage. In the case of huntsmen, when mounted on horseback, style was studied in the set of the breeches at the knees, and in the turn of the feet in the boots and stirrups. In all such matters of taste Sir Francis was a connoisseur. It has often been laid to the charge of such portraiture that the tailor makes the man: but we should rather say that the artist in the first place makes the tailor, — he suggests the suit in which the figure will look best. The most careful of the president's portraits being seldom more than a bright and pleasing reflection of society, the study of historic costume was foreign to his purpose; the treatment lay generally so much on the surface that there was no need to go further back than the newest fashion. In future times these paintings will be valued as showing the manners, the costumes, and the field sports of the upper ten thousand in the nineteenth century. It must be admitted that Sir Francis Grant acquired through long practice a ready knowledge of the human face; the likeness seems to have come to the canvas soon, and, when once caught, further elaboration was not cared for. The execution appears thin, but felicitous and facile; it had, moreover, the advantage of telling out clearly in light and silvery tones. The courtier painter proved himself specially happy in female portraiture. Grant, like Reynolds, seems to have had an intuitive insight into the graceful traits of womanhood. Among works which served to make his reputation was the likeness of Lady Gleulyon, exhibited in the Academy thirty-five years ago. This success decided him to forsake his early and more careful treatment, for the ready and lucrative style of fashionable portraiture. Among much-admired and oft-quoted works are the portraits of the Marchioness of Waterford, the Ladies Howard, Lady Rodney, and Mrs. Beauclerk.

An artist cannot reach beyond his own mental limitations, and even a portrait-painter can with difficulty do justice to qualities that lie outside his personal sympathies. It cannot be said that the late president met the first intellects of the day on equal terms, and yet before his easel sat Macaulay, Lockhart, Disraeli, Derby, Palmerston, and Russell. But when we think of Sir Thomas More by Holbein, of Sir Thomas Gresham by Antonio More, and of Thomas Hobbes by an artist unknown, we begin to feel that portraiture is on the decline, that the changes from the old style to the modern have been momentous, and that Sir Francis Grant was not quite the man to infuse new life and vigor into a manner which in his hands was daily growing more obsolete. Reynolds commends the old masters who descended upon portraiture from a higher sphere; and it is but reasonable to suppose that an artist capable of rising to the high argument of history can read and portray all the more worthily living contemporaries who are now making our modern history. Of Hay-

don it used to be said that he could not paint so much as a portrait, and therefore was unequal to history. Grant never soared into history or poetry, and hence his portraits never rise from the individual into a generic humanity.

Sir Francis Grant did not suffer seriously in the exhibition in 1868 of "National Portraits" at South Kensington; he at least shone among great masters as a star of the second or third magnitude. Looking at "The Meet of H. M. Staghounds," "The Melton Hunt," and that real masterpiece, "Field-Marshal Viscount Hardinge and Staff," we could not but regret that the painter had bartered away this careful, solid, and well-finished mode for the blandishments of fashion. Admirable, in another way, is the portrait of Lord Chancellor Truro. Sir Francis was so much of the true artist that his canvases speak with an intellect not his own; but he shared the common weakness of preferring sitters whose names threw a halo round his studio. It did not fall within the plan of his life to seek out genius in poverty and obscurity. He had not, like Reynolds, a kindly feeling for literature even when housed in a garret; but, as soon as the world had put the guinea's stamp upon the man, then the courteous painter did not withhold his best services. Lord Macaulay, having dignified the humble position of literature by a title, claimed every attention; and rarely has a head been modelled more massively or with a firmer and freer touch. Lady Stuart Wortley also filled a station to bespeak favorable consideration. Sir Francis was represented in the Kensington collection by thirteen portraits; and to say that he proved at least equal to his predecessor, Sir Martin Shee, were to mete out to him scant justice.

Though the late president maintained the dignity of the Academy, he can scarcely be said to have advanced its intellectual reputation. He stands as almost the only holder of this distinguished office who has no place in the literature — to say nothing of the science — of his country. While lectures delivered or books written by Royal Academicians — by Reynolds, Fuseli, Flaxman, Leslie, Eastlake, and Gilbert Scott — would store a library, scarcely a sentence from Sir Francis Grant will live to after-time. As the Academy banquets Sir Charles Eastlake led his hearers gracefully into paths of literature and of art; but the after-dinner speeches of the last president were chiefly deserving of attention because they gave official announcement of the progress of the masons in the new building, and of the provisions made for the comfort of visitors, including their walking-sticks. But perhaps, after all, Sir Francis Grant's epitaph is best written in the serviceable work he did within the walls of the Academy by his tact in the performance of difficult and often invidious duties. On entering office he at once set himself to appease feuds; he made conciliatory calls on one or more dissentients, and succeeded in bringing them within the pale; he manifested a friendly spirit towards rival institutions, and graciously looked in at the private views of well-meaning exhibitions. Above all, it was his good fortune to hold the reins at a turning-point in affairs when guidance was needful and urgent. His administration has been signalized by the removal of the Academy from Trafalgar Square to Burlington House; by the breaking down of old barriers; by increasing the power and adding to the number of associates; by enhancing the efficacy of the schools; and even by casting a ray of light upon the forlorn hope of innumerable "outsiders." The wisdom of some of these reforms may be questioned; they lie, however, in the direction of popularity.

Presidents, like popes, usually give the outside world premonitory symptoms of the approaching termination of their reign, and so the minds of the members of the Academy are usually turned beforehand to some possible successor. On the present occasion there are rumors, long current, which it is needless to divulge; but it may be stated generally that four or five Academicians are talked of as eligible. The members from whom the selection must be made are nearly forty in number, and therefore it would seem that one in every ten is deemed worthy of the higher dignity — a larger percentage than might have been anticipated. We are happy to know that several of the possible candidates are endowed with some, if not with all, of the desired qualifications. And yet it is obviously a hard matter to find united in the same man the good artist and the accomplished gentleman, possessed at the same time of tact and business aptitude. Artists are supposed by some persons to be the most impracticable of mortals, and yet in the government of their academy they have generally done the right thing. What at the present juncture appears to be needed is a president who in his appointed sphere shall be on an intellectual level with the presidents of the leading scientific and literary societies. — *Saturday Review.*

CORRESPONDENCE.

ENGLISH AND FRENCH ARCHITECTURE. — ENGLISH WORK AT THE PARIS EXHIBITION. — CLEOPATRA'S NEEDLE. — THE DEATH OF SIR FRANCIS GRANT. — HIS SUCCESSOR. — THE NEW LAW COURTS.

London.

The holiday season is drawing to a close; and as the sketch-book gives place once more to the T-square and the drawing-board, another year of architectural work may be said to begin. Most holiday steps have this year been directed Pariswards, where a world of art has been open for inspection. In architecture we have been just able to hold our own; the display of drawings and designs comprises the chief of those exhibited at the Royal Academy during recent years, and calls for no very special remark. It is to be feared our foreign friends do not quite appreciate some of the work we have been doing. The style of the draughtsmanship in which we represent our designs is so different from that of our continental neighbors, that they are often misunderstood, even though there may be a fair knowledge of the architecture of the works themselves. The whole training of the French and English architect is so different that it can hardly be wondered at if the result is most strongly marked in their designs. Broadly speaking, the architecture of the Continent may be said to be more academic, and that of England more individual; hence, while in France it is more uniform in general style, here in England we have all manner of varieties, from the rudest Gothic to the richest classic. In spite of this, however, there is the broad distinction of country and climate; and whether the building be in Gothic or classic there is little chance of the architecture of the one being mistaken for that of the other; the individual character of the nation is too plainly stamped on its face for that. In that medley of fronts in "the street of all nations," really good architecture is conspicuous by its absence; strange that it should be so, but thus it is; and if the designs of British architects, as shown on paper, were not appreciated, the actual specimens as built in the "street" are not much better off in this respect. The best and only houses worth mentioning are in the so-called "Queen Anne" style, which doubtless is hardly quite understood by the classically-trained Frenchman. The house of the British Commissioners, purporting to be in the Elizabethan style, is almost below criticism; and the other two façades, in half timber work and cut brick respectively, are only very middling after all. It seems a pity that while we were at it the official building, at any rate, was not the best we could give, instead of — well, the less said about it perhaps the better. But if we have not made any great impression architecturally, it is some consolation to think that in the arts connected with architecture we certainly take a very high place, and deserve what we have won. The display of artistic furniture decoration, stained-glass, etc., has quite surprised our foreign competitors, and is on the whole well worth a studious inspection. The tendency is to over-richness, perhaps, a general fault in all exhibition work; but notwithstanding this there is much thoroughly good artistic work, especially in furniture and its accessories. Messrs. Jackson and Graham have carried off the grand prize in this department, probably from the richness of their work, and especially of the "Juno Cabinet;" but other firms have quite as good work, artistically speaking, such as Messrs. Gillow; their "dining-room," in the prince's pavilion, is remarkably good; both in design and in color it is most successful. Messrs. Johnston and James, of New Bond Street, also show very good work, notably a sideboard in Old English style, very carefully designed and well studied in detail; also a chimney-piece, though this is a little overdone with carving, etc.; the grate and fender in it, however, are very fine pieces of metal work. Then again Messrs. Collinson and Locke have a large display in the earlier styles; and Messrs. Shoolbred have a wonderful drawing-room in satin wood, most woefully overdone, however, in richness of detail and carving; though the latter is very good and very clever, there is far too much of it; it looks as if it had been designed by a carver. There are other firms, such as the Messrs. Howard, which have also sent good work; but the above firms stand out most conspicuous for the excellence of their designs and workmanship, and fairly produce work which holds its own against anything sent by their rivals at home or abroad, and which has certainly astonished the latter; at all events, not a little; as a whole, therefore, the English decorative artists may be fairly congratulated on the success of their efforts, and the position they have so honorably won in the international race. We hear that several very good commissions have resulted from the Exhibition, and it is hoped they may prove some return for the great labor and expense some of the exhibitors must have lavished on their contributions.

Here in London the most recent and noteworthy addition to our architectural monuments has been made by the erection of Cleopatra's Needle, on the Thames embankment; the work of raising it on its new site is now finished, and the scaffolding taken down (or nearly so). Viewed from the river, or from Waterloo or Charing Cross bridges, it is a striking object, and groups very well with its surroundings. It does not look very large, though perhaps larger than was to be expected, considering the immense space of which it forms the central feature. The obelisk is very well placed on its pedestal, the position of which is about midway between the two bridges; on each side of the pedestal are to be placed bronze sphinxes cast from old examples, — rather a modern antique idea, but probably more in keeping with the obelisk itself than any new ones we are likely to design. Then on each side of the pedestal inscriptions are to be cut, giving the history, in a few words, of this wonderful stone, from its birth in the quarry at Syene, and its erection at Heliopolis by Thothmes III., about 1500 B. C., to its erection on the banks of the Thames in the forty-second year of the reign of Queen Victoria, in 1878, embracing a period of nearly three thousand four hundred years, and including such events in its career as its removal from its original site to Cleopatra's city, Alexandria, in B. C. 28, during the reign of Augustus Cæsar; its presentation to the British nation in 1819, by Mohammed Ali, in memory of the victories of Nelson and Abercromby; and its transportation to England, with its loss and recovery in the Bay of Biscay during its memorable voyage

last year. The names also of those engaged in the enterprise, at the head of which stand those of Dr. Erasmus Wilson and Mr. Dixon, the engineer. We understand also the names of the brave fellows who were lost in the attempt to relieve the crew of the Cleopatra, during the gale in the Bay of Biscay, will not be forgotten. Thus, in a few, simple words, which will carry the thoughts of their readers through the long ages of its history from Cleopatra to Victoria, will the record tell how its destiny has been to weld a connecting link between two mighty empires. A cast of the obelisk is being taken for the South Kensington Museum, and we believe a model of the ingenious scaffolding designed by Mr. Dixon for its erection will also be made, that the *modus operandi* may not be forgotten.

Within the last week the Royal Academy of Arts has lost its president, by the death of Sir Francis Grant, at the age of seventy-five. His work was almost exclusively in portraiture, and few artists have filled the chair with more geniality and courtliness of manner. Coming of an old family (of the same stock as your late President, General Grant), and allied to more than one noble house, he was to the manner born, and has been a very popular president. He entered the Academy in 1842, was elected R. A. in 1851, and to the chair in February, 1866, receiving shortly afterwards the honor of knighthood. He was a D. C. L. of Oxford, and an honorary member of the Royal Scottish Academy, the Pennsylvania Academy of Fine Arts, and the Belgian Society of Artists. Most of the celebrated men and famous beauties of his time have sat to him for their portraits, and he received a gold medal at the Paris Exhibition in 1855.

Mr. Leighton or Mr. Millais is spoken of as the probable successor of Sir Francis. The present state of English art in general, and the relations of the Academy to other artistic circles outside its walls in particular, make the coming election of more than usual importance, as much will probably be expected from the new president, from an administrative as well as from the art point of view.

Workmen are now busy fixing the great clock on the southeast tower of the new Law Courts. It projects over the street below (the Strand), and is supported by a great carved corbel. The dials will face up and down the street, and it will be fitted with chimes and bells. When this is finished and the scaffolding cleared away the whole of the eastern block may be said to be completed, and might be ready for occupation now in a few weeks' time if required. It is perhaps too early yet to criticise the general effect of the structure, but the tower looks as if it belonged to a fortress, while the block of offices is full of charming "bits," the detail of which is most excellent, both mouldings and carving being full of vigor and spirit. On the western part of the site the walls of the courts themselves and the great central hall are slowly rising from the chaos around, and considerable progress is being made with the rest of the Strand front, including the main entrance with its flanking octagonal towers, the central feature of the general façade. B.

THE MASSACHUSETTS CHARITABLE MECHANIC ASSOCIATION'S EXHIBITION. III.

BOSTON.

THE fair has closed, and I have as yet said nothing of the exhibits of the various educational institutes; the Institute of Technology, the State Normal Art School, the City of Lowell Free Drawing School, and the School for Modelling and Carving for Women. These collections are all in several rooms of the Tennyson Street school-house, which is joined to the gallery of the main exhibition-building by a bridge, the walls of which are hung with some large drawings of the Charles River embankment as proposed, and some large but not over interesting photographs.

The Institute of Technology has brought together examples of the work of its students in various departments, which ought to be sufficient to give the public a more general and just appreciation than I fear has yet obtained of the broad field which is occupied by that school, and of its claim to a more generous support from the State and from private bounty. Of course the greater part of its teaching is not of a sort of which any exhibition can be made on these walls; but the work of the departments of architecture, mechanical engineering, mining and metallurgy, of practical design in manufactures, and of mechanics' work, is illustrated by very full and interesting collections, which must have been seen by great numbers of people to whom the knowledge of the work of the Institute will sooner or later be of use.

The architectural department, to begin with, as we learn from a printed statement hung on the walls, exhibits seventy-seven drawings selected from the regular work of the school for a year and a half past, comprising elementary drawings, fac-simile copies of originals made in the Paris School of Fine Arts, and those elaborated from free-hand sketches of churches and other buildings in Boston. There is enough variety in the work here illustrated to satisfy any inquirer that although the teaching is confessedly modelled on that of the Paris school, there is no blind adherence to its methods. If one were inclined to cavil at too much time spent on what Viollet-le Duc calls the "impossible and impracticable problems" of the Ecole des Beaux-Arts, as the restoration of a Pompeian house or a Roman villa, he would readily see in the careful drawings of the humbler buildings of to-day in our own streets that the archaic is not taught to the exclusion of the modern. The work of these classes improves visibly from year to year, both in design and in rendering.

From the engineering department are shown a series of thesis drawings of bridges and tunnelling, and portfolios of drawings on various subjects, also models and photographs of notable bridges actually built. An Ashcroft steam gauge, with a removable dial, allowing an easy inspection of the works, and a Dixwell pyrometer, are also shown. The department of mining and metallurgy exhibits a few specimens of laboratory work, with instruments and specimens; and the Lowell Institute school of practical design, a crowd of designs in color of widely varying merit, for woollens, prints, ribbons, cretonnes, table-covers, wall-papers, and the like. The nicety of these drawings always makes them interesting even to the general eye, even when a collection of the same designs in the material for which they were made would be far from entertaining. There is, too, a very notable collection of specimens of the work of the students in the technical school at Moscow, consisting of metal work, as rivetings, brazings of joints, and weldings, wooden models of heavy tools, as drills, reamers, etc., wood-turnings beautifully finished and accurate, and joiners' work of irreproachable neatness. This collection was presented by the government of the Moscow school to the Institute, when the latter was contemplating the establishment of a similar branch of teaching. This is now in full operation, and shows, beside the Moscow collection, some very creditable specimens of the work of its own pupils in the same line.

The State Normal Art School makes an imposing display of students' work in almost every department of art. There are outline drawings of foliage from nature, some excellent shaded drawings from the round object, some geometrical designs mostly from plant forms, both in outline and in color, and some examples in modelling, of which the subjects are not always of the most interesting, but which surprise one by the ease and confidence of the handling. I remember specially a very free and graceful festoon of flowers and foliage from nature. There are water-color drawings of flowers and fruit which look very little like the work of beginners, and two or three examples of time sketches, a head in water-color, from life, done in four hours. In addition to these there are some very workmanlike mechanical drawings of subjects in engineering, and a progressive series in architectural design, comprising plans and elevations of buildings from measurement, in outline and in color; detail drawings; an analysis of the historical styles of ornament, and two designs for a wooden country-house and a brick mansion, respectively, the latter showing a good deal of well directed and profitable study. It will be allowed by anybody who examines this multifarious display, that the State Normal Art School has, if the wisdom of state education in art be admitted, made good its claims to a continued and liberal support.

The City of Lowell Free Drawing-School sends also a large number of drawings, framed and in portfolios, the latter containing, as I should judge from a hasty glance, mostly indifferent work, while among the former are some very respectable architectural drawings, and others in crayon from the round of considerable merit.

The School of Modelling and Carving for Women is just entering on its third term, and here makes a very interesting exhibition of what it has done for a beginning. As might be expected the greater portion of the examples are in plaster, varying from bits of leafage, mostly naturalistic and in low relief in panels or otherwise, up to small heads, and including a lovely profile head of Mozart, also in very low relief, and a spandrel and festoon or two in conventionalized foliage. There is also some delicate and graceful wood-carving, mostly in the way of frames and screens. Vigor and boldness naturally do not yet appear, but grace and prettiness are everywhere; and that so much facility can be acquired by beginners in the brief time during which the school has been at work must be a continual surprise to the pupils themselves, as it is certainly to outsiders.

Indeed the rapid, even sudden development of the taste and talent for design among all classes of our American communities within the last ten or fifteen years is a singular phenomenon. I do not suppose any new faculty has been created in the national mind, but a new field has been opened to cultivation, and the energy and persistency with which it is worked are, to say the least, remarkable. What we see at this fair covers only a portion of the field; we must remember what is doing in all the city and town drawing-schools, at the Museum of Fine Arts, by the new societies for art needlework, and in a thousand homes in the way of china-painting and embroidery, to acquire an adequate impression of the spread of the new influence. The phenomenon is certainly extremely gratifying, and tends to awaken a feeling of complacency. It is to be hoped the enthusiasm is a wholesome one. What is to be feared is that there is somewhat too much of it, and that it partakes of the nature of abnormal development. We hear now and then a mild complaint to the effect that the city and state are spending money unwisely, if not unjustifiably, in maintaining so extensive an apparatus for the teaching of art; that the students of music or of medicine might not unreasonably ask why similar advantages should not be extended to them in their studies. Into that question I do not enter, but it has struck me sometimes, in considering the immense and rapid growth of art-studies among us, that there is in it something exaggerated and factitious, and that there is really not enough of genuine feeling for art in the national make-up to account for or to permanently sustain it.

A word of praise should be said of the extremely full and interesting exhibit made by Messrs. Prang in the various branches of lithography. Their long series of prints for crayon and stump drawing,

and also for sepia and India inks, and, perhaps even more than these, their natural history series, a most varied collection of subjects,—leaves, blossoms, and fruit, beautifully drawn and colored, and "designed as aids to object teaching,"—are, I presume, as perfect examples of what can be accomplished by the lithographic process as have ever been exhibited.

It is pleasant to be assured as this fair is brought to a close that it has not only pleased and instructed its thousands of curious visitors, but has resulted in an unexpectedly large profit to the association. Let us hope the next exhibition will be held in a building of its own, more adequate in size and adornment to the quality and variety of the products, both of art and of industry, which will await its invitation.

AMERICAN INSTITUTE OF ARCHITECTS.

BOSTON CHAPTER.

The Annual Meeting of this society took place on Friday evening, November 1, at the Massachusetts Institute of Technology. In the absence of the President and Vice-President, Mr. Ware was elected temporary chairman. The following list of officers was elected for the ensuing year: President, E. C. Cabot; Vice-President, J. H. Sturgis; Secretary, H. Van Brunt; Treasurer, W. G. Preston; Committee on Admissions, Messrs. Sears, Tilden, and Fox; Committee on Business, Messrs. Longfellow, Van Brunt, and Peabody.

The resignations of Messrs. A. C. Martin and R. G. Shaw were reported.

The following resolutions were passed:—

Resolved, That the Boston Chapter of the American Institute of Architects approves the method of levying the assessments of the Institute proposed by the committee of ways and means and adopted at the Annual Convention of 1877.

Resolved, That this society recommends that the committee of ways and means be a standing committee with power to fill its own vacancies.

A discussion was raised as to the expediency of offering the services of the society to assist in the architectural education of the draughtsmen, junior members, and students of the architectural school, by lectures or lessons during the winter. A general willingness was expressed to make some special exertions in this direction, and the matter was referred to the committee on business.

A communication was read from the secretary of the American Institute of Architects, stating that a vote had been passed by the Board of Trustees authorizing the president of each chapter, as a member of said Board, to receive and act upon all credentials required of candidates for fellowship, and to report his recommendations to the Board.

After some further especial business, the meeting adjourned.

PUBLICATIONS RECEIVED.

Tilton's Hand Books of Decorative Form. No. I., Greek Ornament. Illustrated with twelve plates printed in the original colors. Edited by W. R. Ware, Professor of Architecture at the Massachusetts Institute of Technology. Boston: S. W. Tilton & Co.

Flaxman's Outline Designs. First Series. Boston: S. W. Tilton & Co.

An Elementary Course of Geometrical Drawing, containing Problems on the Right Line and Circle, Conic Sections, and other Curves; the Projection, Section, and Intersection of Solids; the Development of Surfaces, and Isometric Perspective. By George L. Vose, A. M., Professor of Civil Engineering in Bowdoin College; author of "Manual for Railroad Engineers." Illustrated by thirty-eight plates. Boston: Lee and Shepard. 1878.

NOTES AND CLIPPINGS.

A Curious Accident.—A Munchausen-like accident happened at Pulaski, N. Y., Saturday night, October 26, where the floor of a stable fell and left five tied cows hanging by the neck. When found on Sunday morning they were all dead.

Dutch and English Paintings.—Some manuscript letters written in 1818–20 by Sir David Wilkie, the English artist, to a friend, have been acquired by the British Museum in London. The following extract is interesting for its bearing on the statements we lately made upon the destructiveness of preservation:—

"At the Hague I met with an artist who was very much surprised that so many pictures of the English school should be found to crack and fade. I told him that their reputation for fading was in some degree a gross calumny, but that for their cracking, one and all of us must plead guilty to that. He wondered what we used in our colors, for he said that a cracked picture either ancient or modern is quite unknown in Holland. From what he said of the vehicles they now use (drying oil and masale varnish) it must be the same with ours, and the difference must be either in the purity of their oil or in a more careful use of the varnish. The Dutch and Flemish painters, however, in guarding against the effects of time have not been able to guard against that powerful auxiliary of decay, the picture cleaner. Those admirable works that have come back from Paris are now suffering after all the hazards of their journey under this terrible personage. I saw a fine picture of Vandyke at Antwerp undergoing a thorough scouring, some others were intended for the same process, and at the Hague some of the pictures of Ostade, Jan Steen, and Paul Potter had been partially rubbed into the very 'heart's core' and are now out of all harmony and keeping."

Plaster-of-Paris.—M. Landrin has just communicated to the Academy of Sciences the results of long-continued studies relative to the different qualities of this substance. He finds that the more or less rapid setting of the plaster is due to the mode in which it is burned. Its properties are very different when it is prepared in lumps or in powder. The former, when mixed with its own weight of water, sets in five minutes; while the latter, under similar conditions, takes twenty. The reason probably is that plaster in powder is more easily burned than when it is in lumps, and what tends to prove that fact is, that when the latter is exposed longer than usual to the action of fire it sets more slowly. Gypsum, when prepared at a high temperature, loses more and more its affinity for water, retaining, however, its property of absorbing its water of crystallization. Plaster heated to the red, and mixed in the ordinary manner, will no longer set; but if, instead of applying the ordinary quantity of liquid, the smallest possible portion is used, say one third of its weight, it will set in ten or twelve hours, and then it is less porous and becomes extremely hard. To prepare plaster for moulding it must be burned slowly for a long time, sufficiently to drive off all its water, and for its molecules to lose a part of their affinity for the liquid. M. Landrin stated that a similar result could be obtained by other means. If the plaster is exposed to the fire of the kiln for a time short enough to allow it to retain seven or eight per cent of its water, it is useless, as it sets almost immediately. If, however, the burning is again resumed, the substance soon loses its moisture, and, if then exposed to the air, it very rapidly retakes its water of crystallization, and then absorption continues more slowly. It can then be used; it sets slowly, but acquires great hardness.—*Galignani.*

Patents for the Year 1877–78.—The report of the Commissioner of Patents for the fiscal year ended June 30, 1878, shows that the receipts of the office amounted to $734,888, and the total expenditures were $655,906. Of the amount expended, however, $50,000 was for the restoration of 18,583 models injured by the fire of last year, and, omitting this item, the excess of receipts over expenses appears to have been $118,982.

The Peacock Hall of Delhi.—In Beresford's "Delhi" is to be found the following description: "Peculiarly set apart for the reception of nobility is a quadrangle of moderate dimensions. The building is a very beautiful pavilion of white marble supported on massive pillars of the same material, the whole of which, with the connecting arches, is richly ornamented with flowers of inlaid mosaic work of different colored stones and gilding. It is raised on a terrace four feet high, the floor of which is composed of flags of white marble. Between each of the front row of pillars is a balustrade of marble, elegantly carved in several designs of perforated work. The top of the building is ornamented with four marble pavilions with gilt cupolas. The ceiling of the pavilion was originally completely covered with filigree work;" but in 1799 the Mahrattas, after a capture of the city, took the silver down and melted it, the value of the same being estimated at nearly a million dollars. "In the cornice at each end of the interior hall is sculptured in letters of gold, in the Persian language, 'If there is a paradise on earth, it is this.' In this hall was the famous peacock throne, so called from its having the figures of two peacocks standing behind it, their tails being expanded, and the whole so inlaid with sapphires, rubies, emeralds, pearls, and other precious stones of appropriate colors, as to represent life. The throne itself is six feet long by four feet broad. It stood on six massive feet, which, with the body, were of solid gold, inlaid with rubies, emeralds, and diamonds. It was surmounted by a canopy of gold supported by twelve pillars, all richly emblazoned with costly gems, and a fringe of pearls ornamented the borders of the canopy. Between the two peacocks stood the figure of a parrot, of the ordinary size, said to have been carved out of a single emerald. On either side of the throne stood a chatta, or umbrella, one of the Oriental emblems of royalty. They were made of crimson velvet, richly embroidered and fringed with pearls. The handles were eight feet long, of solid gold, and studded with diamonds. The cost of this superb work of art has been variously stated at sums varying from £1,000,000 to £6,000,000. It was planned and executed under the supervision of the same Austin de Bourdeaux."

Numbering Houses.—A contrivance for rendering the numbers of houses visible by night has come into quite general use in Paris. It consists of a hollow triangular prism, nine inches long, two of whose sides are formed of panes of blue glass, on which the number of the house is picked out in white; and this prism-shaped lamp glass rests against the front of the house, so that the two sides with the numbers on them can be plainly seen by the passers-by. In the interior of the prism is a gas jet, fed by a pipe from the house.

A New Artist of the Sixteenth Century.—A correspondent of the London *Athenæum* says: "Mr. Ed. Fetis claims to have discovered a new artist of the sixteenth century—a painter almost of the highest order, who signed his pictures, and whose name is not to be found in any art biography. The facts relating to this worthy, collected by Mr. Fetis, are briefly these: Michael-Angelo Immeraet was, on the 22d of October, 1656, received a member of the Antwerp Confraternity of Bachelors, in 1668–61 he belonged to the Guild of St. Luke in that city, and in 1665 his subscription to a kind of burial club was paid by his wife. This, with the fact that he painted and signed a picture of very great merit on the well-worn subject of the 'Continence of Scipio,' is absolutely all that is known of this artist. The picture in question has only recently been discovered in an Antwerp garret, and is so badly preserved that it is doomed to early destruction."

An Observatory on Mount Ætna.—The scheme for an observatory on the summit of Mount Ætna is again pushed in the English scientific journals. The atmosphere there is peculiarly clear, and it is thought that some important results might be arrived at by a series of daily observations.

Reprints.—Mr. John Henry Parker is preparing a fifth edition of his "Concise Glossary of Architecture," and a seventh edition of Rickman's "Attempts to Discriminate the Styles of Architecture in England."

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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CONTENTS.

SUMMARY: —
The Indiana Capitol Commissioners Again. — The Washington Monument and Government Engineers. — Street Soil of New Orleans. — The Thames Conservancy and the Sewage of London. — School of China-painting in Boston. — Miss Hosmer as an Inventor. — A New Motor. — *Der Techniker* . . 161
THE EXPLOSION OF STEAM-BOILERS 162
THE LIGHT OF THE FUTURE 164
THE ILLUSTRATIONS: —
The New Château St. Louis, Quebec, Canada. — Stable at Indianapolis, Ind. — Music Room of the King of Bavaria at Munich 165
CORRESPONDENCE: —
Letter from Paris 165
FRENCH CRITICISM OF ENGLISH WATER-COLOR PAINTING . . . 166
DR. SCHLIEMANN'S EXCAVATIONS AT ITHACA 167
NOTES AND CLIPPINGS 168

THE troubles of the Illinois State-house commissioners are not limited to their intercourse with architects. A very pretty quarrel has been going on for some time with some of the disappointed bidders for the work. The contracts for the building having been given to Messrs. Kammacher and Denig, the next lowest bidders, Messrs. Farman and Pearce, complained that they had been unfairly discriminated against in the competition; that the letting of the contract was a put up job; and that the contractors' securities were inadequate. They therefore demanded an inspection of the papers, and that being refused, sent a letter to the commissioners, notifying them that there was reason to suspect them of want of fairness in letting the contract, and want of prudence in accepting the bond, promising to "institute such proceedings as may be lawful and necessary to secure fairness and protection," — in other words threatening them with a law-suit, — and requesting them to furnish for their information (Farman and Pearce's) a copy of the contract and bond. The commissioners, after two days' deliberation, declared the openness and fairness of their competition, and the rigor of their bond; and refused to submit the papers to inspection, on the ground that the bondsmen did not care to have their names known and that the commissioners were responsible for their acts, not to the disappointed bidders, but to the Legislature. We do not hear that the thing has gone any farther as yet, nor do we know anything of the merits of the question; but we should think that if all public officers were to be required to produce for inspection and justification their records and documents before anybody who chose to call for them, they might find that they had nothing else to do.

THERE is discontent among the faithful at the slow progress of work upon the foundations of the Washington Monument, under Colonel Casey's direction. Some one has taken the pains to compute that at the present rate it will take two hundred and forty-one years' work to finish the monument according to its design, — a computation which to many people will be not unpalatable. The wish, therefore, occurs that the work might be put into the hands of some contractor who should agree to finish it within a given time. The writer of a letter from Washington in the Hartford *Times*, from which we take these facts and fancies, prophecies that people will by and by find out "that it is a bad investment, besides being a fearfully slow one, to put any kind of public work into the hands of army officers." We are afraid that this represents the idea of a good many inconsiderate people. If the friends of the monument should grow so impatient of official deliberation as to tire of importuning the Government for aid, there would, perhaps, be no harm done; nor could we quarrel greatly with those who may wish, if the monument must really be finished, that it could be by contract work of the ordinary perishable kind. The difficulty would be, we suspect, in providing the money to pay the contractor, though it is very likely that contractors might be found, such as they were, under almost any circumstances. But for a real friend of the undertaking to wish to get it out of the hands of government engineers we take to be a serious mistake. The common tendency to undervalue the deliberate thoroughness of their work is one of the bad signs of the times. The Washington Monument is a difficult if not a hazardous construction, and there are no men in the country in whose hands one may feel that such a construction is, on the whole, quite so safe as in theirs. It is well to have them to remind us that in our most important works solidity and good workmanship are yet more important than haste or cheapness.

NEW ORLEANS is taking its turn of uneasiness at the recklessness of dirt contractors and graders. The New Orleans *Times* not long ago called attention to the fact that the garbage which had been removed from the city was brought back and used for filling, after the manner of contractors. In consequence of this complaint a committee was appointed by the mayor to examine into the matter. The report of this committee, just rendered, shows a deplorable condition of things. Visiting the dumping ground of the street cleaners, which singularly enough is in the city itself and surrounded by many houses, they found three acres of land covered with four feet of foul deposit, kitchen refuse, dead animals, and other disagreeable substances, upon which a hundred or two of stray swine were feeding, rooting up the soil in all directions, and filling the air with horrible odors which sickened the people in all the houses about, and even infected the milk in the dairies. Examination of people in the neighborhood showed that this accumulation had been used by somebody as a hoard to draw from during the spring and summer, so that a good deal of it had been carried away somewhere. Further inquiry showed that where street filling was going on it was the custom to use first a layer of street garbage and market refuse without the ceremony of taking it to the dump, and then a top-dressing of street-dirt, which was probably the contribution of the dumping ground. One cannot help wondering how such things can pass unnoticed by the authorities of a city where yellow-fever is a regular visitor, in spite of the statement which we saw not long ago that the dirtiest regions in New Orleans — and the description of them was not savory — were the healthiest. The wonder grows a little when the committee tells that the City Council passed an ordinance allowing street-dirt to be used as a foundation for the monument to General Lee, him who of all the confederate heroes was perhaps in best odor everywhere. This privilege, says the committee, was "abused," for "the foulest stench imaginable greeted the passers by." At one point however the contractor's fortitude gave way, for being ordered to bury dead animals in some road filling he refused, and hauled them to the dump.

WE have called attention before (*American Architect*, Jan. 12, 1878) to the complaints of the Conservators of the Thames that the costly sewers of London were failing to satisfactorily accomplish their purpose. These complaints, which have brought on a prolonged war between the Conservators and the Metropolitan Board of Works, have been supported by the popular voice, and have been revived in great strength by the experience of the passengers who survived the disaster of the "Princess Alice," a short time ago. She was sunk by collision a little way above Barking Creek, where is the outfall of the great sewer, and our readers may remember that the foul condition of the water in which the passengers were submerged led some persons to adopt the rather overstrained theory that they were poisoned rather than drowned. This accusing surmise brought the Metropolitan Board to their feet with a resolution of inquiry, as a result of which they have plumply declared that the sewage which goes into the Thames is neither noxious nor offensive, and by this assertion they stand stoutly, notwithstanding the fact which seems to be amply proved that the sunken hulk of the "Princess Alice" was found to have been covered before many hours with a deposit of indescribable foulness. In spite of this, and of the testimony of one of their members, who unfortunately lived near the outfall, the Board stood gallantly to their colors, and voted down a resolution which was proposed, requiring a committee to report whether the sewage could not, at a moderate cost, be so purified before its discharge as to make it innocuous and inoffensive, — because, said they, to do so would be to condemn themselves by admitting that what they discharged was noxious and offensive. To this they add the assertion that the amount of suspended matter in the water is very trifling and that the deep-water channel has increased in the last four years. The engineers of the Conservators reply that the analysis of the Board is of water taken during an unusual flood, that the increase of the channel is the result of dredging, that

it dates from before the establishment of the sewers and has almost stopped since, that ships have grounded where ships did not ground before, and that banks of mud have deposited in various places, whose origin is unmistakably in the sewers. The general opinion of those who have given the matter thought, backed by the testimony of popular observation, seems to be decidedly against the Board, and there is talk of prosecuting them for discharging unpurified sewage into the river, if money can be found to maintain a suit which would doubtless be very vigorously defended.

The Boston Society of Decorative Art proposes to establish a class in porcelain-painting, which, like the School of Drawing and Painting, and the School of Carving and Modelling, will be given shelter by the Museum of Fine Arts. So popular has this kind of decoration become that it is worth while to provide some means of instruction in it, both to give capable amateurs an opportunity of learning to use their ability to advantage in an art, which, like all other arts, has its technical secrets, and still more, perhaps, to give a standard of comparison and a chance for discrimination between the capable and the incapable, a thing of which our amateur decorators stand a good deal in need. The class will be taught by Mrs. William R. Ware, whose skilful work is well known since the Centennial Exhibition. At first the instruction in painting will be only in the less difficult art of over-glaze painting, which is all that most amateurs are likely to busy themselves with, leaving the greater difficulties of under-glaze work to the future; but it is proposed to set up wheels in one of the rooms at the Museum, that the pupils may get instruction in "throwing," and opportunities for practice at the wheel will be provided at the potteries in Chelsea. If this practice can be carried so far as to produce some skilful workers in the clay it would have a double advantage; for not only might the work of such amateurs be a gain in itself, but their influence on the manufacturers might be a very good stimulus. There is no better training of eye and hand than the shaping of fictile ware, and the training may be made of just the exacting kind that our amateurs specially need. The hasty multiplying of manufacture is not favorable to excellence in fictile work. It is not difficult for amateurs to equip themselves for it, and the mechanical skill which it requires though refined is, so to speak, in small compass, and therefore requiring a less range of experience than in most arts. The competition of a few amateurs of real skill, working deliberately, and producing little, but that of the best they could accomplish, might be of good service in improving the quality of the work of the regular manufacturers.

Our lady sculptor, Miss Hosmer, who has been receiving considerable praise from London newspapers for the model of her latest statue, "The Pompeian Sentinel," by no means limits her activity to sculpture, but seeks distinction also as an inventor. It is some time since the first announcements of her discovery of a process for compacting ordinary limestones into fine marbles, by the simultaneous application of pressure, heat, and moisture. She is said to have actually contracted, under her patents, to furnish floorings, wainscoting, and other decorative work in artificial marble for the British Embassy building which is now going up at Rome. A correspondent of the New York *Evening Post*, writing from London, besides crediting her with one of the many inventions for turning the leaves of a piece of music, describes a new method of modelling which she has contrived. She makes a rough model in plaster of Paris, and when this is brought into the proper poise and proportion, the surface being left somewhat within the intended dimensions, it is covered with a thick coating of wax, in which the actual modelling is done. This method she claims to be much less troublesome than working in clay, while the model is far more durable than one of clay, requires less care to keep it in condition, and gives much better the effect of the intended marble, besides being pleasanter to look upon.

Miss Hosmer's *Capo d' opera* in invention, however, is the discovery of a new means of applying motive power; or even a new power, if we may trust our inferences from the account of the *Evening Post's* correspondent. The power is that of the coming motor, electricity; but there is neither battery nor electro-magnet, nor circuit, nor any means for transmitting an electric current, it is said, the power being furnished by a series of permanent magnets in a manner which utterly defies all the present theories and expectations of scientific men, and by means of contrivances which she is not yet prepared to make public. The invention has been a study to her for fifteen years, says Miss Hosmer, and a London instrument maker is now building a machine of four-horse power, which will be exhibited in London this winter, when it is finished, and show that a revolution in power-machinery is impending. Miss Hosmer cites the testimony of some mechanicians in favor of her success, though she does not seem to have yet provided herself with witnesses among scientific men of known position. Of one gentleman, who reminded her that she was seeking after perpetual motion, we are told that he "could scarcely believe his own eyes," and had to be convinced by repeated demonstrations, at the end of which he had quite lost his faith in the impossibility of anything. It is perhaps useless for anybody who is not in Miss Hosmer's confidence to conjecture how a permanent magnet, if such things are to be found, or a series of them, can be made to furnish continuous motion, nor is it quite safe to decide against even the discoveries of amateur science till they are made known; but the ungallant reader may hope to be forgiven if he is a little reminded, by these accounts, of the familiar feat of standing in a basket and lifting one's self by the handles.

We have received the first number of a new German technological periodical to be published fortnightly in New York, by Mr. Paul Goepel, Tryon Row, and called *Der Techniker*. It is a quarto of sixteen pages, approximately on the plan of the *Scientific American*, but intended especially to meet the wants of German Americans, or, as the editor in his short and straightforward salutatory says, "to further the interests of German inventors as well as the advance of such branches of industry as are in German hands." It is a neat, well printed journal, from Roman type, like most German technical publications, illustrated with clear cuts of various machines; and touches in this first number a considerable range of subjects. It has illustrated articles on some English hydraulic metal-working machines, on Klinkerfues's Hygrometers, a pneumatic beer-pump, Tronvo's Polyscope, and a workmen's Respirator, a descriptive list of selected German inventions, and designs for a common chair and and an easy-chair taken from the *Workshop*. There are, besides, the first of a series of letters from the Paris Exhibition, this one on the display of carriages; an interesting letter about Mr. Edison and his inventions, based on a letter to the New York *Tribune*; an article, to be continued, on patent laws; a current trade review; a full list of recent German and American patents, which is apparently to be continued from number to number, and a variety of short articles, original and selected, including book notices, articles on the polishing of metals, on trade-marks, the Mississippi jetties, the tobacco trade, the Vesuvian Railway, etc. The original material of the paper seems to be clearly and capably written, entirely from the practical point of view rather than the theoretical.

THE EXPLOSION OF STEAM-BOILERS.[1]

This little pamphlet is, as its title indicates, mainly controversial; but it raises and discusses questions which are of paramount importance to the whole community. Modern civilization brings us in contact with the steam-boiler at every turn in our daily life. Leaving out of view its various industrial applications in factories, in steamboats, and in railroads, it is now very generally used for furnishing the supply of heat in stores and offices. It is precisely in this latter application that the lowest grade of intelligence in those who have the care of the machine will be found. We use the word machine advisedly. A steam-heater for a dwelling cannot be placed in the same category as the ordinary furnace. It is a machine, and a very dangerous machine if tampered with or improperly treated. And yet it is undoubtedly true that many of these machines, especially when used for ordinary heating uses, are under the superintendence of men who have no qualification beyond that of a fire-stoker. We know that Patrick and Bridget wear out and use up our air-furnaces by the most flagrant disregard of ordinary physical laws. We endure this from year to year, put our hands in our pockets, and draw out the means of repairing damages, and remain content. Should we remain thus content if we really believed that a like ignorance or negligence on the part of attendants might at any moment lead to an explosion and the destruction of human life? And yet, if we accept the statement of the author of the "Attack upon the Judicial Decision," this is what we should expect. He says, "There is no mystery, no occult, potential energy suddenly and

[1] The Cambridge Boiler Explosion. An Examination of the Attack, in the Columns of The *Boston Daily Advertiser*, upon the Judicial Decision. By J. E. Rowsson.

mysteriously liberated, and not a particle of proof of originally poor iron;" and he then goes on to show that the use of water unfit for the purpose, and the *abuse* of the machine, led to the explosion. We have no intention of entering into the controversy between these two disputants. The points in controversy were fully examined, in the light of the testimony of the best experts, and a judicial decision has been rendered. What we do claim is that a boiler, supposed to be perfect when delivered to its owner, cannot with safety be left to the charge of ignorant or inexperienced superintendence.

Then arises the question, How do we know, when we purchase a boiler, that it is perfect, and suited to our purposes? The law steps in here, and says it must be inspected, and we must show the certificate of inspection. There seems to be no dispute in this case that the boiler was inspected, and was certified to be safe for one hundred pounds pressure, and yet that it burst at a temperature of 311°, which corresponds to a pressure of 64.33 above the atmosphere, with "everything in a normal condition; no excessive pressure, no lack of water, no apparent disturbance inside or outside of the boiler, no excessive fire or blowing off of steam." Does not this show that there was something at fault in the inspection?

We think the author of the pamphlet before us has presented his whole case in the strongest terms, when he says, "There are many boilers in use that are as unsafe as was the one in question at the time of its explosion; and it does not tend to greater security, and it is not for the interest of the owners of these boilers, to believe that they may be used with impunity provided they are kept clean."

In justice to the author we must quote his second paragraph: "There are three hypotheses as to the causes of explosion: (1.) The one upon which our practice has come to be mostly based, that they are all caused by gradual rise of pressure, or gradual reduction of strength. (2.) That they are caused by forces too potent to be withstood by any attainable strength. (3.) That many explosions have their origin in an explosive evaporation of water within the boiler; but this never to an extent that may not be entirely obviated by suitable construction and management, or withstood by the observance of sound principles of construction."

The first hypothesis, the author says, has no scientific basis, and ignores the most prominent causes of explosions.

If the second hypothesis were true the only remedy would be the total exclusion of the steam-boiler from practical use. We might as well harness into a buggy an untamed wild beast.

The third is evidently the only one which appeals to our author.

We wish we had space to follow the author through all his statements, for every sentence is full of matter for serious thought to the public, and every statement so supported by figures (not results, but the detailed computation) that every one conversant with the subject can follow the writer's reasoning, and agree with him or not.

The first point presented is one which only experts could determine. The stock of which the plates were made does not possess "qualities that are indispensable for steam-boilers," and a boiler of the size used could not be built "for a working-pressure one half, even, of that for which the boiler was certified." Plates of that brand sell for half the price of the best roll-welded plates, and for less than one third of the best hammer-welded plates. Just here the outsider may very properly ask, What does brand mean? Brand ought to mean, if it does not in all cases, not merely who the manufacturer is, or whether it bore such and such tests of compression, extension, or torsion, but, by ultimate reference, it should show also of what iron it was made, of what ores, and whether hot or cold rolled. We think Kirkaldy's experiments first called attention publicly to the fact, which is distinctly stated in this pamphlet, that "a knowledge of the tensile strength alone of iron is of no value whatever as to its fitness for use in a steam-boiler;" in other words, Kirkaldy showed that one quality of iron bar, for instance, would bear a high load, and then give way without warning, like cast-iron, while another, more ductile, would not yield until its sectional area was reduced, perhaps one half, and thus its tenacity per unit of area brought very high. That is to say, the bare statement of so much tensile strength conveys a very imperfect knowledge of the quality of iron for a specific purpose. Let those who need any further information upon this point read the account of the experiments made to determine from what ores the iron must be made, and in what proportions the different irons must be combined, to obtain a suitable metal for cannon. The purchaser of a boiler cannot be presumed to have expert knowledge, but such knowledge may, and indeed must, be required on the part of inspectors. This pamphlet tells us that multitudes of boilers are placed upon the market made of plates totally unfit, when new, to bear the pressure for which they are certified. "Plates very rarely test better than the brand. The variation is almost invariably the other way, ... the tensile strength brand varying from five to twenty-five per cent in the better grades of plates above the minimum actual strength, and from twenty-five to fifty per cent above in the lower grades." As the weakest link determines the strength of a chain, so in a boiler the weakest plate and the minimum thickness should be used in computing its strength.

There is no dispute as to the correctness of the ordinary formulæ for computing the strength of boilers under a steady statical pressure. This formula is $pr = tK$, in which p is the pressure per square inch, r is the radius, t is the thickness, and K is the tensile strength of the iron. As the plates are weakened by punching, Fairbairn's rule is adopted, which allows to a double-rivetted seam only $\frac{7}{9}$ of the resistance of the plates of which it is composed. Fairbairn's factor of safety for best materials and workmanship is 6; for good materials and workmanship, 8; for poorer quality of iron, or for defects in the process of manufacture, this may rise to 9, 10, or more, up to a total rejection of the boiler as unsafe.

There is some difference of opinion as to the degree to which the testing pressure should be carried. If not carried far enough, it is worthless as a test; if carried too far, it may strain the materials beyond their elastic limit, and thus impair the future usefulness of the boiler. The committee of the Franklin Institute, after a thorough and extended examination into the causes of boiler explosions, proposed that the law should require the test by hydraulic pressure to be carried up to three times the working pressure. Under such a law the Cambridge boiler would have been tested at 300 lbs., whereas the actual test was only carried to 150 lbs.

We have not space to follow the author through all his discussions. The action of plates under thermo-tension, in which field the Franklin Institute made an extensive series of experiments, is here examined. The effect, upon the strength of boilers, of poor riveting and of good riveting, of imperfect welding in the manufacture of the plates, of the use of a poorer quality of iron as the filling of the pile during manufacture, — all these points are examined and commented upon.

As we stated at the outset, the pamphlet is controversial in its nature, and its main object was to answer the "attack," and to shew that this particular boiler was originally weak, and not fitted for the work for which it was certified; that it was exploded, not in consequence of deterioration by scale on the bottom, not because of neglect or abuse, but because of what the author characterizes, in his third cause of explosions, as "an explosive vaporization of water within the boiler." In other words, a part of the water within the boiler was overheated, a volume of steam was suddenly generated which caused a surging of the water against the back end of the boiler; the iron was "short," and could not withstand this suddenly imposed pressure, and consequently "the back end of this boiler was undoubtedly broken off by the surging of the water within the boiler against the back head."

We call attention particularly to the statement, that this boiler was broken through the *transverse* seam. The same theory which gave for longitudinal rupture the formula $pr = tK$ gives for transverse rupture the formula $pr = 2tK$. That is to say, a boiler is twice as strong against transverse rupture as against longitudinal rupture; or, other things being equal, it will require twice the pressure to rupture it. The formula assumes statical pressure and uniform tenacity of the plates in all directions. Yet here was a boiler certified to bear 100 lbs., and which therefore should require 200 lbs. for transverse rupture, which, under a sudden impulse, gave way transversely, when the pressure was, according to all the testimony, far below that which it was certified to bear. The difference between the mere statical pressure of the steam confined in a boiler, and the work which will be done by a sudden release of this steam, and the conversion into steam of water under a high pressure and temperature, is too important to be overlooked. If we raise a pound of water 1° Fahrenheit above its temperature at maximum density, we store up in it an energy equal to 772 foot pounds, — that is, in cooling one degree, it must by the law of thermodynamics do the work of lifting 772 lbs. through one foot. The boiler under consideration was working with steam at a temperature of 311°. A very simple computation will show the destructive power developed when this steam and the water with which it is associated have their temperature suddenly reduced by an explosion from 311° to 212°. The author of the pamphlet, while showing that his adversary's estimate is entirely erroneous, proves at the same time what we are most concerned with, that in every boiler we have a reservoir of stored energy of vast amount, capable of producing wide-spread destruction, if suddenly released by an explosion. If the boiler, even of good material, is so constructed that a thorough circulation does not take place, this explosion is likely to occur at any moment. Zerah Colburn, in his essay on "Boiler Explosions," says, "Destructive explosions often occur at pressure of ten pounds to twelve pounds per square inch in low-pressure boilers; and it is on many accounts improbable that anything like the calculated bursting pressures of boilers is ever reached, even where the most frightful explosions have occurred." Our author closes some remarks upon construction with, "Showing that there was no suitable provision for the circulation of the water within the boiler. And there was no provision for the safe deposit of sediment. A boiler with these defects would be unsafe, even if built of the best materials."

While we recommend this pamphlet most strongly, as presenting in a very clear and forcible manner some of the principal points connected with steam boilers, apart from the special controversy which called it into being, we cannot close these remarks without stating that, after all, the thing that most forcibly suggests itself is the utter inefficiency of our present system of inspection. The law requires that boilers shall be inspected, but at the same time it holds owners responsible for any damages resulting from their use. Can any one, after a careful study of the pamphlet before us, turn to his inspector's certificate with any sense of security? Here we have the testimony of a well-known expert that the material not merely of this boiler, but of many is iron totally unfit for the purpose and unsafe at any pressure; that modes of construction are in vogue which would render a boiler made of the best materials unsafe;

that factors of safety are adopted, below those which experience has sanctioned in other countries; that the test by hydraulic pressure, instead of being carried to three times the working pressure, was carried to one and a half times. If this is the way in which certificates are given, and the weak machine is then entrusted to ignorant superintendence, the only wonder is that destructive explosions do not occur more frequently.

THE LIGHT OF THE FUTURE.

Of the various magneto-electric machines that have been brought forward, that of M. Gramme is the most generally used. As soon as his machine became practicable, an English company purchased the English and American patents, the Société d'Encouragement awarded a gold medal to the inventor, and a large number of manufacturers ordered the apparatus. The exhibitor has been awarded prizes at the Exhibitions of Lyons, Vienna, Moscow, Linz, and Philadelphia; and now about 500 machines of his construction, with magnets or electro-magnets, have been delivered, and the demand for them is still increasing. Electric lighting, which before M. Gramme's invention did not exist, speaking industrially, is at the present day within the domain of things practical. It is not within our scope to give a detailed description of his machine; it is sufficient for our purpose to state that it furnishes continuous electric currents, the direction and intensity of which may be changed. The electric current having been generated is conducted through an insulated wire to a perpendicular rod of retort carbon, the point of which is placed exactly above the point of a similar rod, the distance between the points being less than a quarter of an inch. This intervening space is the electric arc, and the current passing through that interval from the rod above to that below heats the points to a state of intense incandescence, producing the electric light. The current passing only in one direction,—from the upper or positive pole to the lower or negative pole,—consumes the positive at double the rate of the negative, and consequently the distance between the points has to be continually readjusted by clock-work and a magnet, constituting the regulator or electric lamp.

By the side of the electric lamp with regulating apparatus for the carbon rods as they become consumed, Jablochkoff's candle has also become the material for electric lighting. M. Jablochkoff's light completely suppresses the regulator. His invention was presented to the Academy of Sciences in October, 1876. The carbons, instead of being opposed, are placed side by side, and are separated by an insulating fusible substance. When the current begins to pass, the voltaic arc plays between the ends of the carbons. The layer of insulating matter melts, volatilizes, and the double rod of carbon slowly consumes, exactly as the wax of a candle progressively exposes its wick. M. Jablochkoff now burns in his candles, as they are called, powdered asbestos. It seems as if the interesting labors of M. Jablochkoff will have practical result, and that they will increase the domain of electric lighting, for his lamps are now largely used. In Paris, besides numerous larger electric lamps, at the present time, there are burning many Jablochkoff candles, of which we may mention eight on the Place de l'Opéra, twenty-four in the Avenue de l'Opéra, eight on the Place du Théâtre Français, six at the Palais Bourbon along the front facing the Place de la Concorde, seventy in the Grands Magasins du Louvre, eight in the shops of the Belle Jardinière, sixty in the Concert de l'Orangerie des Tuileries, thirty two in the interior of the Hippodrome.

Returning to the Gramme machine, it appears that the first light machine constructed by M. Gramme fed a regulator of 900 Carcel burners; its total weight was over 2,000 pounds. This machine served for a long time for the experiments on the clock-tower of the Houses of Parliament at Westminster. The fault found with this machine was that it became heated, and gave sparks between the metallic brushes and the bundle of conductors on which the current was collected. This, however, has not given rise to any serious inconvenience during five years. M. Gramme's next machine was less powerful, of a power of only 500 burners, and consequently of smaller dimensions. When a current is sent into two regulators, each will give 150 Carcel burners. This apparatus has been introduced on board the Suffren and the Richelieu, of the French Navy; on the Livadia and the Peter the Great, of the Russian navy; it is employed by several Governments for service in fortified places. This machine is described as excellent, but its luminous intensity is slightly feeble when the atmosphere is foggy; its price, however, is somewhat high. The inventor has improved upon this machine, and constructed one which, when coupled in tension, gives a luminous intensity of 800 Carcel burners at 700 revolutions per minute, and, if coupled in quantity, 2,000 Carcel burners, with 1,950 revolutions per minute. It has been adopted by the French Ministry of War, by the Austrian navy and artillery, by the Norwegian, Turkish, and other Governments. By further simplification, M. Gramme has been able to introduce a machine most suited for industrial purposes, large workshops, and large, covered spaces.

As has already been remarked, the electric light may be advantageously employed in a large variety of works, for it admits of obtaining a great quantity of light at a small expense. By its means, the loading and unloading of cargoes, the mounting of machinery, carpentry, weaving, dyeing, and similar trades may be carried on by night just as well as in broad daylight. It is necessary, however, to employ two machines, in order that the light of the one should counteract the shades thrown by the other. It has been found by experience that the naked light may be employed, the workmen themselves having asked for the removal of the opal globes which it was thought at first necessary to use. The electric light preserving the tints of colors, this property has been utilized with success by several dyers for standardizing their colors by night.

The electric light is most effective for high rooms; when ceilings are of a less height than 12 feet, its introduction becomes more difficult. As a rule, there may be conveniently lighted with a single apparatus about 5,000 square feet of fitters' shops, lathe-shops, tool-shops, and modelling-rooms; half that space in spinning-mills, weaving establishments, and printing-rooms; and about 20,000 square feet of yard, courtyard, dockyard, quay, and open-air works.

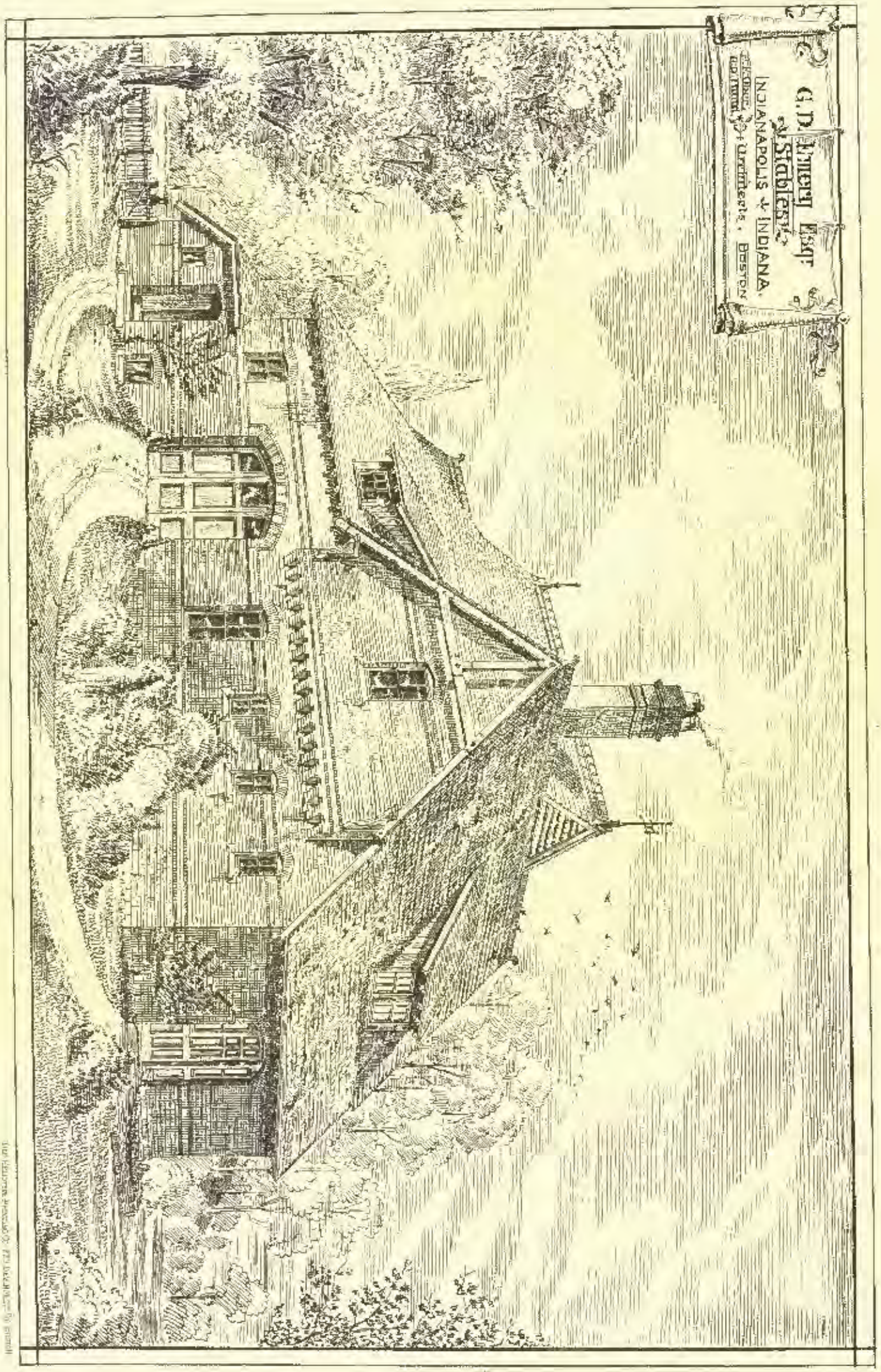
In a country like the British Isles, where the safety of the mercantile marine and the navy depends so very much upon the amount of security with which ships may enter ports, and the care bestowed upon keeping up an effective system of light-houses to warn the navigator against approaching dangerous coasts, the electric light would be sure to prove a welcome auxiliary in effecting those objects; and so in reality it has, being now employed at many of the stations. It renders visible at night, at distances varying from 2,000 to 6,000 yards, objects such as buoys, ships, coasts, etc. The electric light was first applied to light-houses in 1863. In that year trial was made with an Alliance machine at the light-house of La Hève, near Havre, the results being so satisfactory that no doubt all light-houses would have been provided with the new light if the question of expense had not stood in the way. It has been stated that the electric light is seen at least five miles farther than the oil light, and that in hazy or foggy weather the range of the light is twice as great with the former as with the latter.

In England, official opinion was at first against the introduction of the electric light in light-houses, on account of the peril of interruption; but this has been overcome. There are now electric light-houses, besides those of England and France, in Russia, Austria, Sweden, and Egypt. Everywhere their action is pronounced satisfactory. Hitherto machines of only 200 Carcel burners have been tried; but it is stated on good authority, that the French Administration of Light-houses are about to experiment with a Gramme machine of 2,000 burners. This machine probably will greatly enhance the advantages, already recognized, of electricity over oil, and will perhaps determine a radical change in the existing illumination of light-houses.

The lighting of works by night is highly interesting. The Spanish Northern Railway, after trial, used the light as early as 1862 in the works proceeding in the Guadarama mountains. The expense per hour for material consumed was 2.90 francs per lamp; the saving effected upon the use of torches was 60 per cent. The light has also rendered important services in the mines of Guadarama. The air became so vitiated in the workings by the explosion of charges and the combustion of the miners' lamps that the ordinary lamp would not burn. When a Serpin's regulator was sent down, a complete change took place, respiration "becoming as easy as in the open air," the lamps remaining alight. Amongst open-air works may also be cited, as executed by the aid of the electric light, those of Fort Chavagnac at Cherbourg, of the Chemin de Fer du Midi, the reservoirs of Ménilmontant, the building for the Moniteur Universal, and more recently, those of Havre harbor and docks, the Exhibition of 1878 in the Trocadéro, the Avenue de l'Opéra, the Grands Magasins du Louvre, and other establishments.

Very little attention has hitherto been bestowed upon the great service electricity will ultimately render in lighting up theatres and similar places of public resort. Besides the comparative cheapness of the electric light, its use will do away with the expensive fitting-up necessitated by gas. The great drawback to thorough enjoyment caused by the flare and heat of hundreds of gas-flames will be entirely removed. No longer broiled and heated up to almost fever-point, we shall be able to sit in comfort and, more than that, perfect safety against that most awful of all calamities, a fire in a theatre, or even a panic such as quite recently occurred at Liverpool. Panics will be avoided; for people will soon come to know that fire from electric light is impossible. We were forcibly reminded of the great danger to which audiences are now exposed during a recent visit, on a Saturday evening, to the Covent Garden promenade concerts. We pictured to ourselves the scene that would ensue if, during one of those crowded performances, the mass of inflammable material which has been piled up, in addition to what is already stored there,—with the evident endeavor to "decorate" the place,—were to catch fire: it required but a little fancy to conjure up a picture of an Inferno to which nothing was wanting. With the electric light, on the contrary, we should have, instead of a sweltering, gasping multitude, an audience able to enjoy the musical or dramatic fare set before it. As yet, however, little progress has been made in the employment of the electric light inside theatres.

But the electric light has not been a stranger to the stage for some time. It made its *début* in 1846, in the "Prophète," at the Opéra in Paris. At that early time, however, it was only employed to produce the effect of the rising sun. Its success was complete, and since that time it is rarely that a ballet or an opera has been mounted without the introduction of some effect of the electric light. Since 1855 a host of ingenious combinations have been realized by its aid,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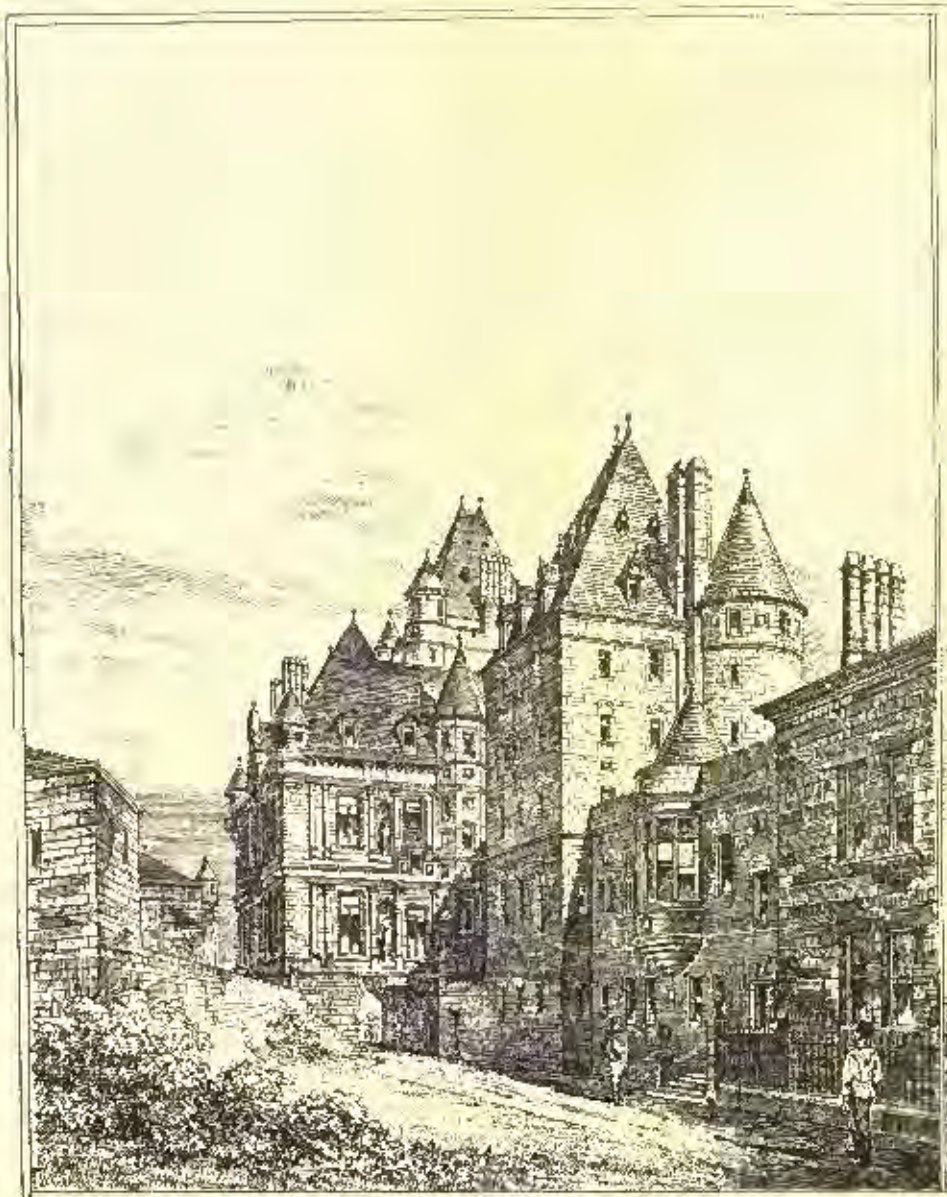
INDIANAPOLIS & INDIANA.
Architects, BOSTON



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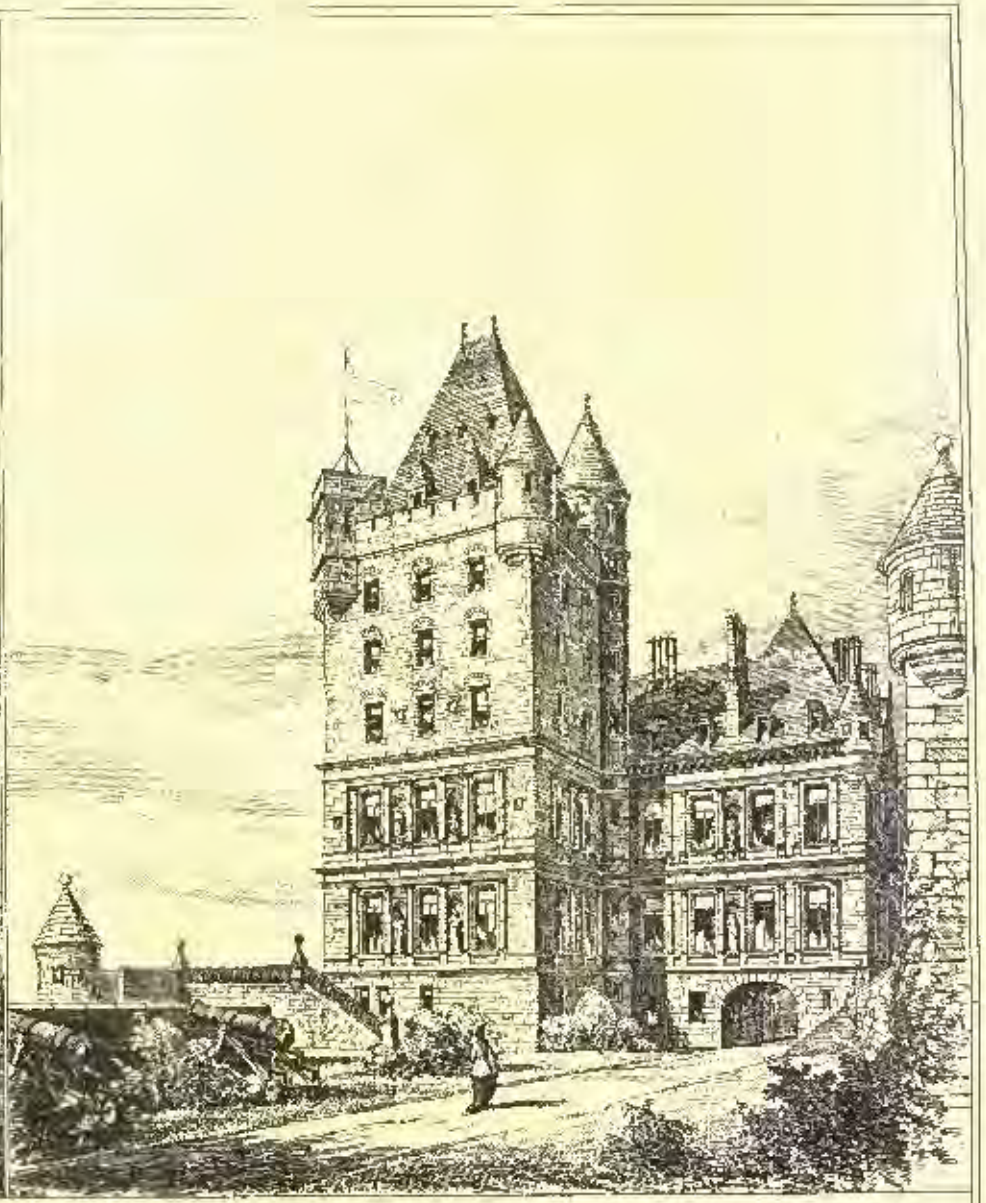
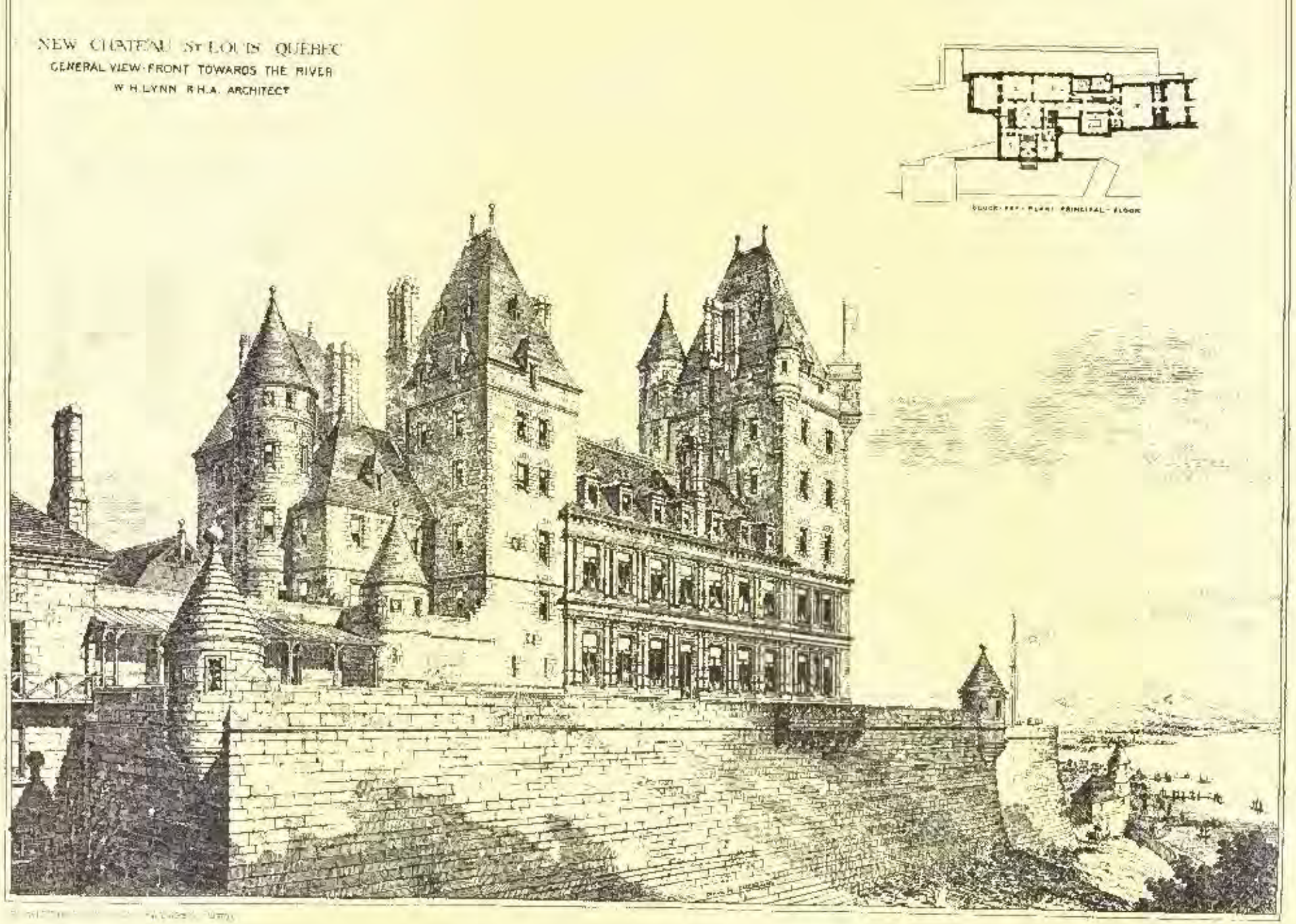
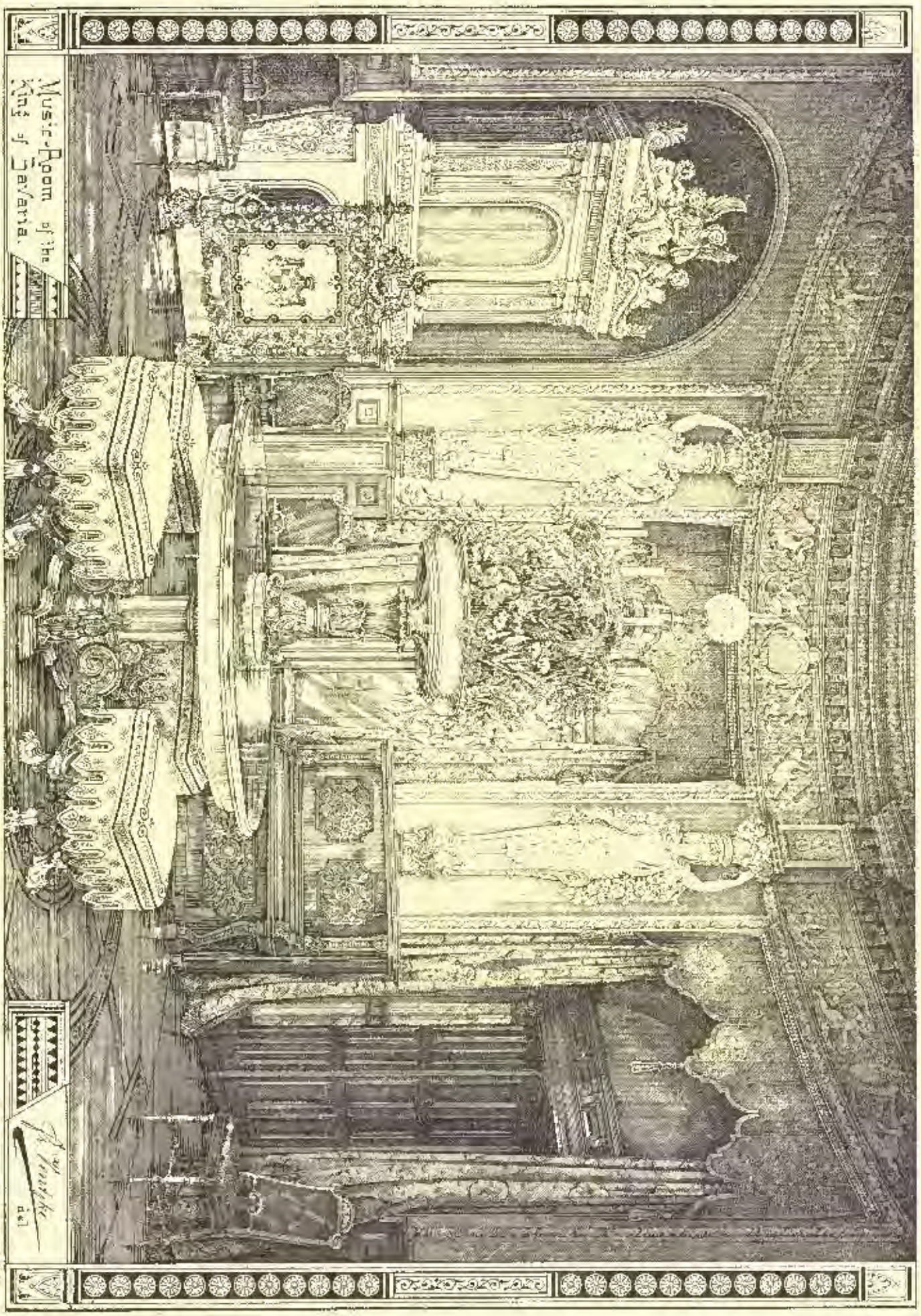


VIEW FROM THE KING'S BASTION


NEW CHATEAU St LOUIS QUEBEC
GENERAL VIEW · FRONT TOWARDS THE RIVER
W. H. LYNN R.H.A. ARCHITECT
PLANT PRINCIPAL - FLOOR


Music-Room of the Villa of Lavania.

—rainbows, lightning, reflections of the sun, etc. At the new Opéra at Paris, batteries are used, the architect not wishing to locate a steam-motor in any part of the building. At the Opéra in Vienna, where steam is employed throughout, use is made of a Gramme machine, which gives very good results.

The question of the cost of electric lighting is such a highly important one, and has given rise to so much discussion, that we recur to it, though we have examined it already at some length on a previous occasion, when it was shown that, even under the most unfavorable conditions, the electric light is certainly below the cost of gas for equal amounts of light. The electric light as used by the London Stereoscopic Company, who employ a Siemens machine, is stated to be three times cheaper than gas, light for light. M. Fontaine calculates the saving with a Gramme machine to be over 22 per cent. Mr. Sprague, who was recently sent to Paris by the Commercial Gas Company to report on the electric light, comes to the conclusion that gas is twice as cheap as the Jablochkoff light. Other gentlemen have given their opinion for or against electric light with regard to its cost. But any unbiassed man not a shareholder or interested in gas companies, who has taken the trouble to look into the matter, will have arrived at the conclusion that the evidence points in favor of the new light. Moreover, as improvements are introduced in the production of the electric light, its present cost will be still further reduced. In fact, it is one of the conditions of its success that the spirit of inquiry and invention should be turned in the direction of reducing the expenses.

The great problem which remains to be solved is that of dividing the light in such a manner as to split up its intense brilliancy into separate useful atoms, each of which fractions must be powerful enough to serve for illumination under the same conditions and at least with the same effect as gas. When that is done, but not until then, the electric light will have proved itself a powerful rival to gas. The startling announcement has just been made that Mr. Edison, the inventor of the phonograph, if not of the telephone, has succeeded, in conjunction with Mr. William Wallace, an electrical manufacturer of Ansonia, Conn., in perfecting a dynamo electric machine to such a degree as to make it the very thing wanted. As no details have yet been forthcoming, we prefer to suspend our judgment. — *The Builder.*

THE ILLUSTRATIONS.

NEW CHÂTEAU ST. LOUIS, QUEBEC, CAN. MR. W. H. LYNN, R. H. A., ARCHITECT.

We reproduce from the *Building News* several views of parts of the new Château St. Louis at Quebec, the original sketches for which we published in our issue for April 14, 1877, together with a full description of the proposed work.

References to the Plan.

1. Drawing room, 25ft. × 32ft.
2. Ante-room, 31ft. × 24ft.
3. Dining-room, 37ft. × 24ft.
4. Hall, 45ft. × 25ft.
5. Library, 22ft. × 18ft.
6. Porch.
7. Business-room, 15ft. × 18ft.
8. Waiting-room, 12ft. × 12ft.
9. Back stairs.
10. Principal stairs.
11. Corridors.
12. Butler.
13. Billiard-room, 27ft. × 20ft.
14. Ante-room.
15. Armory, 42ft. × 32ft.
16. Yard.

Officers' quarters beyond armory.

CARRIAGE HOUSE AND STABLE. MESSRS. L. F. OBER AND GEORGE D. RAND, ARCHITECTS, BOSTON.

This stable has been built for about $4,000, for Mr. George D. Emery, in Indianapolis, Ind.

INTERIOR OF THE MUSIC ROOM OF THE KING OF BAVARIA, MUNICH. DRAWN BY MR. FR. VENTZKE.

The colors used in the decoration of this room are blue and white, the national colors of Bavaria. All sculptured work is in white marble except the frieze, which is moulded in stucco.

CORRESPONDENCE.

ENGLISH AND FRENCH SEA-SIDE ARCHITECTURE.

PARIS.

In lately writing about the new suburban houses in London, if I made some reservations in my praise of them it was chiefly because I criticised them from an English point of view, which may be taken as the highest standard of domestic architecture. Still more evident is this after a trip along the coast of Normandy, where fashion in the last few years has attracted many wealthy people to build. After seeing the houses of the English painters, of which I have spoken, it was peculiarly interesting to visit Etretat, recently brought to notice by the painters Isabey and Lepoittevin, and made celebrated by the works of Alphonse Karr, till now it has become the chief summer resort of the Parisian artistic world, including, besides artists in our acceptation of the word, composers, singers, actors, and littérateurs. Offenbach, Faure, Diaz, Ondiné, and a score of well-known artists, have built there, so that one finds there the last expression of French rural architecture. The place itself is charming: a narrow valley breaks through the lofty plateau down to a pebbly beach between fine chalk cliffs, the sloping ground offers picturesque sites, and with its artistic population one might expect original and attractive buildings. Yet from previous experience, I was really surprised to find but one or two houses which could be called picturesque or interesting. One large villa there is, however, which is strikingly picturesque in the half-timber style, and full of cosey corners and balconies looking upon the sea. This last consideration is neglected in the greater number of the houses, which are so placed and designed as to wantonly lose the view. Can it be they are too aristocratic to look out of their windows? as is the case with the Faubourg St. Germain people, some of whose hotels, facing the beautiful Luxembourg Garden and other fine views, are so purposely walled about, and the servants' quarters so placed that the master's rooms look only upon his own little court. In various other ways this feudal spirit of seclusion shows itself. In fact, in Paris no respectable people will be seen sitting by or looking from their windows. The majority of houses at Etretat are built of small, gray cubes of flint relieved with brick, which gives a neat but severe aspect. Roughly laid stucco mixed with something to give a time-stained look is used also with stone or brick finish. M. Faure, the celebrated tenor, has introduced into his brick façade large medallions of faience, but with this exception terra-cotta or tiles are hardly used. One in vain looks for a special sea-side character. Here and there an attempt is made to be rustic by trimming a thoroughly city house with wooden eaves and jig-saw work, but the effect is much that of a man in a winter surtout wearing a straw hat.

At Trouville and Deauville, where there are many costly villas, the architecture is even more such as might be built in the heart of Paris. Fine, handsome stone and brick structures they are, if you will, but with no piazza or other characteristic of sea-side dwellings open only two or three months in the summer. Again, however, there is one intelligent exception. One of the largest villas at Trouville is framed with timber and filled in with diagonal brickwork. The design, with its bold gables and finely-carved details, is a clever adaptation of the sixteenth century style. Indeed the motives are easily traced to a fine old François I. house mouldering away in a narrow street of Lisieux, which, distant only a few minutes by rail inland, is filled with the best examples of timber-framed houses of various periods and designs. It is a perfect museum in this respect, yet the architects seem no more tempted, either by the desire of novelty or by that of perpetuating the style of the locality, to turn to it than a Parisian lady is to abandon her fashions for the Normandy cap. It is curious how uninfluenced by, in fact how utterly unconscious of, the mediæval mania of their neighbors almost in sight across the water, the Frenchmen are. Few French architects have ever been in England, and no illustrated journals from it find their way here; for in general, what the architects here cannot get from their own publications, — simple as they are there is never in them a line about England, — they are profoundly indifferent and ignorant about. A thoroughly French trait.

These two houses I have mentioned show, however, how a French architect can succeed if he seriously attempts picturesque architecture; but it does not come naturally to him, nor can distinctively rural architecture be said to exist in France. Attempts at it generally suggest Parisians on a picnic in the country, and though the provincial architect may have a more sincere appreciation of rural life than his city brother, his buildings do not show it. The ambition of the worthy bourgeois who builds in the suburbs of a city is to imitate a *maison-à-loyer*; he wants the same flat façade with its iron balconies. In imitation of the *mairie* it must be isolated from all shrubbery by as broad a gravel walk as may be, and there it stands, bare and square, as dreary to the Anglo-Saxon as if the architect had never carefully proportioned the windows and cornice, made the lines of quoins to exactly correspond with them, and carved some graceful little cartouche over the door. It is an interesting question why the French, with their sensitive taste and quick fancy, should be, in rendering the outside of their dwellings attractive, so far behind a less artistic nation, for superior as their public buildings are in breadth of composition and in monumental qualities, the veriest tyro in England will give a cosey, habitable character, surely essential to a dwelling, which they almost never obtain. A clew to this is suggested on noticing that the bare, box-like character becomes more apparent southward; for Italian classical influence is responsible for the theory that architecture should concern itself with monuments only. The Italians will lavish art on a fountain or a casino, but a small dwelling is not worth the thought. The training of the Frenchman is against him also; since the very habit of studying for symmetry and simplicity, by subordination of details, which gives such breadth to their large structures, prevents him from seizing upon the prettiness — pettiness to him — which is acceptable in dwellings.

On the other hand, the English, applying to their large buildings the same methods as to their dwellings, fail to give to the former the breadth necessary to make them grand or imposing. Details catch the eye on all sides, and there is no unity or tranquillity. English architecture may in fact be said to be at present confined to details, for there is little study of anything else. If a man has a town-hall to design he at once thinks of his sketch of the tower at Bruges, and, remembering a fine dormer window at Rouen, his chief aim then becomes to work in those two patterns at all costs. It is said for example of Mr. Street, that, after his first small sketch, he at once gives his attention to the full-sized details, and the want of subordination of secondary features to the main effect is unhappily illustrated in

his New Law Courts. The Frenchman, on the contrary, beginning with a free-hand sketch, studies his masses in plan and elevation; and when his plan is entirely fixed, he goes back to his small elevation, approximately fixes its proportions, then doubles its scale, which develops new defects to be corrected, repeats this process until he is satisfied, and then only he comes down to the details, which thus grow out of the requirements of the design; and it may be the building is up and the rough hewn blocks in place before the smaller details are decided on.

I believe the French forego an aid in not making perspectives of their houses; for misleading as a perspective may be in case of large structures where the distortions of foreshortenings are great, and which when built present façades seen almost in geometrical elevation, it is different with small buildings well in the plane of the picture, and which in nature, from their small size, generally show two sides at once. Apart, however, from all this, the French have not so keen an appreciation of the picturesque as the English. The latter, as a nation, have always been travellers and accustomed to sketch. In all lands a sketcher is at once set down as an Englishman. Thus the people at large, as well as the architects whose education aside from office work lies much in sketching, naturally seek and note "bits" which are picturesque. On the other hand the French rarely travel or sketch, and their theoretical education leads to the study of elevations and plans in books rather than of the real buildings.

In comparing these two nations, so utterly different, it is amusing to note the effect of their characteristics at the sea-shore. The one people spend their leisure in walking, the other in talking. Consequently at the English watering-places, such as Brighton, there are vast jetties running out into the sea, expressly built for "constitutionals." Here, day and evening, both sexes tramp up and down. At the end of this walk is generally a wider place where the band plays, but where there is little or no shelter for seats. The French at all seasons like to sit in the open air and chat, and this, combined with their love for the theatre, accounts for their casinos, which at every watering-place are the centre of interest from the wide piazzas where they can sit. These casinos vary from the small chalet of a little-frequented place to the magnificent structures of the fashionable ones. In general, however, they front upon a wide terrace overlooking the bathing beach, and consist of piazzas, partly enclosed for bad weather, of a theatre in the middle into which can be opened dancing and concert halls on either side; and these are flanked by billiard, refreshment, and reading rooms. At many places there is a small theatrical company and orchestra.

We Americans by our traditions are peculiarly open to English influences, and our characteristics as a young, enterprising nation, eager to travel and assimilate from all sides, favor this sentiment for the picturesque; the recent results have certainly been encouraging. I truly believe that our finest Newport villas are, for comfort and elegance, within and without, superior to any dwellings of the kind here on the Continent, and surpassed by none in England, while our modern detached city and suburban houses also fairly rival any English ones. An Englishman may find them mere copies of his own designs, but I am confident a Frenchman can perceive in them a certain character of their own distinct from the borrowed motives. We must, however, remember that for a style to be progressive it must be modified according to its own requirements, and not by wholesale borrowing from others; and to this end the French and German methods of patient study at home should not be neglected.

In my recent letter about the building of the American church at Rome there appeared a typographical error which I desire to correct. It reads, "a Swiss archbishop" regulated the accounts and was clerk of the works; the reading of course should be "a Swiss architect."

R.

FRENCH CRITICISM OF ENGLISH WATER-COLOR PAINTING.[1]

Were it not that England, whose participation in our great Exhibition has been on so grand a scale, devotes a special gallery to water-color drawing, it would be superfluous to make this branch of art the subject of an article. The other nations, including France, are scarcely represented in this *specialité*. Moreover, the English artists' treatment of water-colors scarcely differs from their method in oil painting; in fact, one passes from the galleries in which their canvases are hung to the one containing their drawings without being made aware of the fact by any novel impression. We find here the same soft tones of color, the same careful and somewhat hesitating manner, which seems to dread producing too brilliant an effect, and as it were to shrink from uttering a note pitched in a key that might disturb the general harmony of the composition. English painters, and most especially water-color artists, are perfectly indifferent to what we term *le morceau*; their dominant preoccupation is, that the idea of the picture should be conveyed to the mind as directly as possible; they consequently carefully avoid distracting the eyes of the spectator from the subject. Our artists take an opposite view; they paint for the sake of painting, considering the organ of sight sufficiently precious to merit every possible effort to gratify it.

If our neighbors do not indulge in the seductions of the palette they have other merits not less estimable. Their composition is admirable; and if they obtain the sense of harmony by somewhat muffled tones, nevertheless they undoubtedly do produce harmony. It is, therefore, not too much to assert that if they may learn something from us, they can most easily return us the service; and they have an idiosyncrasy quite their own, whereas ours differs in nothing from that which is common to all the art schools of Europe.

English water-color art has lost much of its individuality since the Exhibition of 1867. It has become a serious art, which ranks with oil painting. Under these new circumstances one is tempted to inquire whether its origin has not been somewhat forgotten, and even we may go further, and contest its *raison d'être*. It undoubtedly matters not, when we see a work of art for the first time, whether it has been thrown on a canvas or on a sheet of paper, and it is a very secondary consideration what the exact quality of the colors employed thereon may be; but it is of importance to preserve a distinctness in the methods of procedure, for a similarity in these methods would deprive us of variety in art production and serve no useful end. It had been admitted that a certain freedom of execution and a liberty in method was granted to the water-color art which would not be tolerated in oil painting. The art was like a young sister, whose giddy pranks would be condoned by her youthful grace and freshness. But the English do not look on things in this light; stiff, ceremonious, and correct in their bearing, their water-colors are after their own image. And verily we have no right to reproach them with their peculiar type; but the critic may be allowed to regret that the special method of water-color study should be so entirely laid aside that it has lost its characteristic physiognomy, and this in the birthplace of water-colors, and in the country which has produced a Turner, a Bonington, and a Cattermole. These remarks, however, do not apply indiscriminately to all English artists; there are some among them whose works evidence careful research for the distinctive qualities of the art, and they paint accordingly; but they who do so are not the most popular, for the cleverest men are in the opposite camp. I shall give a rapid sketch of each.

Frederick Walker and Pinwell stand at the head of their school, in my opinion. Both artists terminated their brief career in 1875, and it is really hard to have to commence their eulogy by the announcement of their death. I shall, however, write of them as though they were here to enjoy the record of their successes.

Walker has everything in his favor. Equally remarkable for the delicacy of his coloring and the accuracy of his draughtsmanship, his composition moreover displays an exquisite sense of nature, and the English school does not possess a more careful observer of detail. These qualities are intensified by a gift peculiar to his own mind, and that is a strongly-developed sense of humor. His water-color paintings, as well as his drawings, fully justify the high position this artist has held in England, and his works have this peculiarity, that if they are frankly English in form and feeling they are first-rate works of art, no matter in what latitude they may chance to be. Mr. Walker has several styles,—the one airy, bright, and cleverly concentrated (this he applies to the illustration of books); the other more that of a painter, where every detail is finished with the utmost carefulness. This style precisely serves his purpose in the composition of the home scenes in which his countrymen delight. Of his first style are the smaller water-color drawings, of the freshness of coloring and rapid execution for which Johannot was remarkable, of which the most noteworthy example which occurs to me is the drawing for an illustration of one of Miss Thackeray's works. A whole drama is expressed in the size of a sheet of letter-paper; the scene conveys a powerful yet sweet emotion, of which the truthfulness to nature is notable, at the same time the sense of vision is gratified by the graceful and humoristic manner of the artist. "The Health to Absent Friends" is the title of his water-color drawing; equal in merit is a wood engraving called "A Bouquet." The publisher has had the good sense not to hand over to the engraver the piece of box on which this delicious composition is designed. The scene is one of the every-day life of a laborer in his cottage, but the talent of the artist elevates the thoughts to a far wider sphere. A few touches of his pencil have sufficed to characterize the moral tone of his personages, their social position, and the feelings by which they are inspired.

Walker excels in his reproduction of children, as do most of his fellow-countrymen, but he does so with a freedom of drawing and a humor which no other English artist has attained, with the exception of Mr. C. Green, especially in his drawings on wood, for as a painter he is less forcible. Children are prominent in almost all Walker's water-colors; the types and attitudes of his tiny personages are as varied as nature itself, and so happily given one never wearies of them. In the very centre of his "Field of Violets" a child is the prominent figure. This work is a masterpiece, and as perfect as are any of the illustrations of which I have already spoken. With infinite gravity she holds the basket in which an aged woman piles the violets she has gathered in the meadow; her figure stooped, in an attitude which recalls our own Millet. His name is the only French one of which we are involuntarily reminded in the English art section; but it must be admitted that it often recurs to us. This water-color drawing of Walker constantly reminds us of a master who would infallibly have added lustre to our art school had he not, by inconceivable carelessness, been all but totally excluded from the exhibition. The gesture of the principal personage in it, and yet more the method of the artist in the composition of the work, recall Millet. There are the same incisive touches of tones at first opponent, but

[1] Translated from the *Gazette des Beaux-Arts*.

gradually blended with an infinite softness, and which convey rather more the impression of a crayon than that of a water-color drawing.

The great majority of English artists, be it said, make use of color in tubes, or else have color prepared on the palette, which facilitates the retouching of the work without this being apparent. Water-colors admit of no such transactions. We have already said that all is well that ends well, and we do not mean to reproach the artists who use these means with the fact, but we are authorized to assert that the tones of color obtained by these processes differ absolutely from the coloring of nature; that however tender may be the harmonies which result therefrom, they are based on a fiction and cost less work. Delacroix's ambition soared higher; he determined to conquer by a struggle with difficulty, and can one blame him? The English are afraid of color; they dread its destroying the idea of their picture by attracting attention and diverting it from the subject. They are right to frame their water-colors as well as their paintings; at the edges of the canvas or of the paper the reflected light from gilded frames raises the tone of the ambient atmosphere, which is much work gained, and the general harmony of a picture is not the worse for this. The indiscretious of our broad white margin are thus avoided, which so often proves a touchstone by which the local truth and freshness of the tones of color can be tested.

The death of Pinwell, in 1875, proved as great a loss to the English school of art. The author of the "St. James's Park" has at the same time more passion and more freedom of drawing than Walker. In his compositions the preconceived idea is clearly defined, and he never allows the technical part of his work to induce him to swerve from it. It would be waste of time to attempt to assimilate his diverse methods of painting with the rules of aerial perspective; he only recognizes gradations of light to a certain degree and in an arbitrary manner. When he has clearly expressed his thought, he stops short, and leaves the rest to mere indications. If I had to choose between what is distinctly given and what is left to the imagination, I should select, on account of the execution solely, those parts of the work indirectly hinted at, for in these the genius of the artist is most truly revealed. Conveying an idea by a few strokes requires adaptability, lightness of touch, and profound knowledge, — qualities which are not common in England, where usually a certain hesitation and heaviness of manner is predominant.

Pinwell is a painter, a philosopher, and a poet at the same time; he combines the two *genres* which are the distinctive feature of English art of the present day. At times he selects an abstraction — as, for instance, a fable — for his subject. He did this when he painted the "Pied Piper of Hamelin." At other times he paints life as it is, and relates its incidents with admirable truthfulness; but he generalizes more than do most of his countrymen, and he delights in painting a moral. "St. James's Park" afforded him an opportunity for painting modern London society. It is evident that when we study this group of the varied incidents in the every-day life of the great city we must carry our thoughts beyond what the artist actually puts on the canvas. This is more than a mere reproduction of the habits and customs of the epoch. That there is here a final and allegorical meaning we cannot for a moment discuss, if we will only study the general plan of the composition. The scene takes place on a bench in the park. The personage in the centre has a sinister aspect, — that of poverty in a black coat. He is either a broken-down gambler or the discoverer of some invention on which he has vainly spent his uttermost farthing; his features bear the stamp of his defeated life. In the fixed expression of his look one can see that he is on the brink of a fatal resolve. What is before him? crime or suicide? He has an honest look about him. One hand is gloved. The Thames may see the end of his history. On the right, a woman in a dark dress and a boy, — street singers both of them. The mother reckons their pennies. There is no doubt as to their story. They are clearly the victims of some heart-breaking misfortune. The boy is old enough to remember; the way in which he looks before him tells us he has seen better days. On the left is a young nursery-maid who blushes while she listens to the whisperings of a fascinating guardsman sitting by her side, and in front of them, a little girl dressed in velvet. While she pushes a baby along in a perambulator, with a pitiful expression she glances at the two poor musicians. Vaguely she feels they are her equals in rank. We have before us two children personifying the well-known types of rank and *décadence*. The bench on which this tragi-comedy is acted is, to use an architectural term, *accosté* in the background on the right by the figure of a woman whom we have a clear right to consider as typifying modern vice, and on the left by a man very comfortably dressed, who carries in his gloved hand a brace of partridges. The contrast is too striking for us not to perceive that he represents labor rewarded, *au-dessus ses petites affaires*, as Gavarni would have said. The outline of a policeman, seen in the distance, may be said to typify the law.

I cannot assert that when Pinwell composed this picture he meant to convey the ideas I have attributed to his personages, but it cannot be denied that his genius had a singular facility of impressing the most ordinary subjects with an elevated order of sentiment. He was, in common with the great majority of English artists, a refined analyzer. The superiority of his genius is made manifest by the conclusions his pictures force upon one. They are works of a rare degree of elevation of tone.

I shall only speak of the third water-color drawing of this remarkable artist — "La Grande Dame," a retrospective study of the habits and customs of England — for the purpose of extolling the brilliance and powerful harmony of its tone. The blues and reds are graduated to a vinous tinge, somewhat displeasing to our French vision; but as soon as one has become acclimatized to the English galleries, where this tone predominates, one admits its exquisite beauty. There are certain portions of this work, and these the least finished, as I have before remarked, the execution of which is simply superb.

The cast is brilliantly represented — perhaps, indeed, too brilliantly — in the water-colors of Lewis, who likewise died in 1875, a year so peculiarly fatal to English artists. By the clearness of his colors, which he used almost crude, Lewis seemed to enter a protest against the pale coloring of his fellow-artists. His water-colors have the appearance of a kaleidoscope; they are, however, admirable specimens of draughtsmanship and of singular elegance of design.

Let us, however, confess that this style is of a past date. He does not stand alone; the romantic drawings of Sir John Gilbert are likewise somewhat out of date, and their intensity of tone only proves this fact. In Mr. Linton's case this energy of tone is at least equal, but the form is more modern. His "Cardinal Minister" is a good historic painting, in the style of Delaroche; the execution displays knowledge and is worthy of the subject. Mr. Gregory exhibits two very remarkable works. His style is full of vigor, of freedom of touch; less, however, than he aims at. The title of one is "Sir Galahad," a knight of the days of romance, who is scarcely discernible in the shadows of night; the mystery which enshrouds him, however, adds considerably to the impression produced. "St. George" is simply the life-size bust of a man, broadly treated in water-colors on extremely rough paper, with scratched-in effects cleverly managed. The saint is of a somewhat ordinary type, but the hands are remarkable for beauty, and prove knowledge of form. This drawing appears all the more startling in effect inasmuch as the rest of the works of the English school are of a peculiarly subdued tone. It is like a trumpet call in the middle of a concert of rippling song.

I shall not dwell on the retrospective works of Messrs. Burne-Jones and W. Crane; they neither differ in style nor form from the oil paintings by those masters, already criticised by M. Duranty. "Love in Death" is nevertheless a curious work by Burne-Jones; but we ask in vain why this artist has drawn on paper instead of on canvas a work of such dimensions, for doing so was simply accumulating its difficulty. Its artistic value is incontestable. The artist has a perfect right to close his eyes to the progress which has taken place since the year 1500. I even consider this fact as the indication of a refined and original nature. The artists of mediæval ages had among other merits that of *naïveté*; but this quality is terrible, inasmuch as it does not admit of imitation. English pre-Raphaelites prove this by the inanity of their efforts. Nevertheless they succeed in interesting us in their works. Who, for instance, could pass by with indifference "The End of the Year," by Mr. W. Crane? Imagine the burial of a year. The body is borne along in a bier; a Christian priest leads the procession; the mourners defile — as in theatres — to the very edge of the grave, which yawns beneath a portico *à la Giotto*. Mr. W. Crane, in a charming little landscape which is the last of his exhibits, entitled "Almond Trees on Monte Pincio," in his adoration for *naïveté* has not kept to the primitive Italian school, but gone off to Japan, and the combination of these two styles has suited him to perfection. I leave to others the task of proving that in acting thus the artist has sacrificed nothing of æsthetic unity, and that if he has drawn from two different streams it is because both spring from the same fountain.

It is time to take leave of the English section. I shall not do so, however, without repeating once more, that the originality, the *naïf* charm, the humor, and the honest tone of the works it contains fully justify their success. Perhaps they lack purely plastic qualities, but we cannot have everything. Our art section is sufficiently rich in merit to admit of our unhesitating admiration of perfections in others of which we must confess ourselves somewhat lacking. — *The Architect.*

DR. SCHLIEMANN'S EXCAVATIONS AT ITHACA.

DR. SCHLIEMANN'S late excavations at Ithaca, though they have not given him any such prizes as he has found elsewhere, have nevertheless afforded him much archæological comfort, as appears in his communications to the London *Times*. Of Mount Actos, where was the citadel of Ulysses, he says: —

"There can hardly be any doubt that, in the same manner as the Acropolis of Athens was widened by Cimon, who included a large portion of its northeastern slope, and filled up the lower space with stones and débris, the level summit of Mount Actos was extended to the north and southwest by a huge Cyclopean wall, still existing, the space between the top and wall being filled up with stones and débris. Thus the summit forms a quadrangular, even platform, 168 feet 8 inches long by 127 feet 4 inches broad, so that there was on the summit ample room for a large mansion and courtyard. To the north and south of the circuit wall are towers of Cyclopean masonry, from each of which a huge wall of immense boulders runs down. But at a certain distance these two walls begin to form a curve, and ultimately join together. Two more Cyclopean walls run down from the top — the one in an easterly, the other in a southeasterly direction — and join the curve formed by the two first-named walls. Lastly, I have to mention a huge circuit wall about fifty feet below the upper circuit wall. This wall has fallen on the west side, but is in a marvellous state of preservation on the other sides. To increase the strength of the place the foot of the rock has been cut away so as to form a perpendicular rock wall twenty

feet high. In the walls are recognized three gates. Between all these Cyclopean walls once stood a city, which may have contained two thousand houses, either cut out of the rock or built of Cyclopean masonry. Of one hundred and ninety of these houses I have been able to find the ruins more or less preserved. I measured twelve of them and found them between twenty-one feet and sixty-three feet long, and fifteen feet to twenty feet broad. The usual size of the rudely cut stone is five feet in length, four feet eight inches in breadth, and two feet in thickness. The size of these stones by far exceeds that of the stones in the Cyclopean houses I discovered at Mycenæ and Tiryns. Some of the houses consisted of only one room; others had four or even six chambers."

He identifies the stables of Eumæus as follows:—

"Near the southeast extremity of the island, about four and a half miles from Vathy, are a number of stable-like rooms, averaging twenty-five feet in length and ten feet in breadth, partly rock cut, partly formed by Cyclopean walls of very huge stone, in which Homer must have seen the twelve swine stables built by the divine swineherd Eumæus. To the east of these stables, and just in front of them, thousands of very common but most ancient potsherds indicate the existence of an ancient rustic habitation, which Homer appears to have described to us as the house and station of Eumæus. This is the more probable, as at a very short distance to the east of this site, and near the sea, is a white cliff with a perpendicular descent of one hundred feet, which until now is called Korax, that is, the Raven Rock, to which Homer refers when he represents Ulysses as challenging Eumæus to precipitate him from the great rock if he finds that he is telling lies (Od. xiv. 393). Below the Korax, in a recess, is natural and always plentiful and pure water, which the tradition identifies with Homer's fountain of Arethusa, from which Eumæus' swine were watered. I excavated as well in the stables as in front of them, on the site of the rustic habitation; the stables I found filled with stones, but on the site of the house I struck the rock in a depth of one foot, and found there fragments of very interesting, most ancient, unpainted pottery, also of pottery with red bands, and masses of broken tiles. I found in my excavations at the foot of Mount Actos two medals of Ithaca, having on one side a cock with the exergue ΙΘΑΚΥΝ, and on the other side a Ulysses head with a conical cap or pilidium; also two coins of Agathocles of Syracuse. These latter coins are here frequently found and abundantly offered for sale. Also Corinthian and Roman coins are very frequent here."

The grotto of the nymphs, where Ulysses hid his treasures, he claims to have discovered, and thus describes:—

The Odyssey mentions a grotto of the nymphs, in which Ulysses, assisted by Minerva, hid his treasures. Dr. Schliemann thinks he has discovered this place in a stalactite grotto near the little port of Dexia. He found no treasure, but says:—

"The grotto is very spacious, and it exactly answers the description of Homer, who says that it has two entrances; one in the north side for men, and one on its south side for the immortal gods, for no man can enter by the divine door. All this is true; but by the entrance for the gods he means the artificially cut hole in the vault of the grotto, which must have served as a chimney to lead off the smoke of the sacrificial fires. From this chimney to the bottom of the grotto is fifty-six feet, and of course no man can enter by this way. But the ages the proprietors of the field seem to have utilized this chimney to get rid of some of the stones which abound here, for the grotto is filled five feet and six feet deep with small stones. From the vault of the grotto hang innumerable stalactites, which have given to Homer the idea of the stone urns and amphoræ, and the stone frames and looms on which the nymphs weave purple-colored mantles and veils."

NOTES AND CLIPPINGS.

Pennsylvania's Heroes. — In response to the invitation of the commission entrusted with the selection of the sculptors of the statues of Robert Fulton and General Peter Muhlenberg, which are to represent Pennsylvania in the Hall of Heroes, several sculptors submitted models of the two statues, which have lately been placed at the Academy of the Fine Arts in Philadelphia. Among the competing sculptors were Messrs. Bailey, Storck, Marker, Manger, Ellicott, Kern, and Roberts, all of Philadelphia; Miss Nevin, of Lancaster, Penn., and Mr. Gould, of Boston. Apparently after the models had been submitted the commissioners decided that the work should be entrusted to native Pennsylvanians only, which at once ruled Mr. Gould and any other aliens out of competition. The award was finally made to Mr. Howard Roberts, of Philadelphia, who will thus have a chance to add the statue of Robert Fulton to his other works, among which are the figures of Hester Prynne, Hypatia, and La Premiere Revolte. To Miss Nevin was entrusted the possibly easier task of representing in marble the "fighting parson" of the Revolutionary War.

Statue of Kamehameha. — The centennial of the discovery of the Sandwich Islands by Captain Cook in 1778 is to be commemorated by a bronze statue, heroic size, of Kamehameha, the conqueror and organizer of the islands. Kamehameha was an ancestor of King Kalakaua, who visited the United States in 1875. The legislative assembly of the Sandwich Islands at Honolulu voted unanimously in August last the sum of ten thousand dollars for a work of art to commemorate their country's hero and their centennial era. The chairman of the committee, Hon. Walter M. Gibson, member of the Hawaiian Parliament, who has charge of this commemorative monument, has placed the work in the hands of a Boston artist, T. R. Gould.

Electrotyping on China. — An ingenious process has been recently introduced in France for electrotyping on a non-conducting material, such as china, etc. Sulphur is dissolved in the oil of lavender spica to a syrupy consistence; then chloride of gold or chloride of platinum is dissolved in sulphuric ether, and the two solutions are in this state mixed under a gentle heat. The compound is next evaporated until of the thickness of ordinary paint, in which condition it is applied with a brush to such portions of the china, glass, or other fabric as it is desired to cover, according to the design or pattern, with the electro-metallic deposit. The objects are baked in the usual way before they are immersed in the bath.

Autographic Telegraphy. — Among the ingenious electrical inventions at the Paris Exhibition is D'Arlington's autographic telegraph. It is designed for use on the battle-field, but there is no reason why it could not be made serviceable in time of peace. It can transmit a map, plan, or message exactly as it may be drawn or written, and if it can do that, it can also send far and wide the portrait of a runaway bank director or any other person who may be "wanted." A general idea of it may be gathered from a verbal description, but a diagram would be required to explain its details. At the transmitting and at the receiving end there are cylinders, each of the same size and driven by clock-work, so as to revolve and to move laterally at the same rate. Each cylinder has an earth connection. The despatch or plan is made with greasy ink on a piece of foil paper, which fits accurately the circumference of the transmitting cylinder. The oily parts of the surface are non-conducting, while the metallic part is conducting. On the receiving cylinder is a sheet of chemically-prepared paper. A platinum wire or "finger" is attached to each end of the wire; and these fingers are adjusted so as to move easily over the cylinders. The sending cylinder is connected with the battery, which is also in short circuit. Whenever the finger of the sending cylinder touches the non-conducting surface the current must go over the long wire and affect the other platinum point; but when it touches the conducting metallic foil it passes over the short circuit, and no electric action is felt at the receiving end. Every time the current goes over the long wire the platinum finger of the receiving cylinder makes a blue mark on the chemically-prepared paper. The result is that an exact counterpart of the plan or despatch is received when the work is done. Every military officer will appreciate the value of this invention. A modification of the same apparatus has been used for engraving, but the employment of it is not profitable unless a great many copies of the same design are required. — *N. Y. Times.*

Curious Cinerary Urns. — In opening a burial mound at Cade's Pond, two miles northeastward of Santa Fé Lake, Florida, Mr. Henry Gilman found two instances of a peculiar kind of cremation. The skull of the subject in each case had been employed as the urn to contain the ashes of the rest of the body. Neither of the skulls showed any signs of having been subjected to the action of fire.

Japanese and Chinese Art. — One or two distinctive features in Japanese art, noted by Sir Rutherford Alcock, furnish evidence of its identity with that of China. The curious fancy for the discovery of human features and forms in rocks and trees and hills, observable in Japanese drawings, owes its origin to the imagination of Chinese artists. In some of the engravings which accompany the text of the "Imperial Compendium of Literature," this conceit is very conspicuous; and in most illustrated Chinese books of travel — such, for example, as the "Fan chu lao" — it forms a noteworthy feature in the landscape. But the point which most nearly allies Japanese to Chinese art, and dissociates it from that of all other, and especially European countries, is the total neglect of the correct study of the human form. In China this arose from a consideration of decency, and it was noticed that when the Chinese ambassador visited the British Museum he walked straight through the galleries of Greek and Roman antiquities without turning his eyes to the right hand or to the left, though in all other departments he examined most carefully the objects on view. In Japan, on the contrary, the notions of decency are of quite another kind. As Sir Rutherford Alcock remarks: "Constant opportunities for studying the nude exist, or did exist until quite lately, in the bath houses, where both sexes bathed in common for hours together; and in the streets and on the roads in summer, it was the exception to see a workingman with any clothing beyond a loin-cloth, — much too scanty to interfere with any artistic requirements." And yet he says, "Considering how well and vigorously they [the Japanese artists] can draw the human figure in action, one is disposed to wonder that they have never learned to draw both hands and feet with something like correctness." Here we have, then, two countries differing from all others in their neglect of the study of the human form. In the one, the oldest of the two, this neglect is a matter of principle founded on the established ideas of decency; in the other, which has notoriously borrowed much from its older neighbor, no such principle is known, and every opportunity is furnished by the habits of the people for the development of this branch of art. What greater proof can we have than this, coupled with the connection which we have shown to exist between the school of art in the two empires, of the obsequiousness with which Japanese artists have followed in the wake of their Chinese masters? — *Exchange.*

Acoustic Gallery at Rex. — Prof. Ch. Dufour, during the last session of the Swedish Society of Natural Sciences at Rex, observed a remarkable echo in the church. The interior is of a rectangular form, with one end rounded. The pulpit is nearly in the middle of one of the large sides of the rectangle. Persons in front of the pulpit, at its foot and a little to the right, hear a speaker with great difficulty; but an auditor standing at two or three metres from the middle of the rounding part hears, with remarkable distinctness, the slightest words which are spoken at the foot of the pulpit. Dufour considers this effect more remarkable than the one in the dome of St. Paul's, at London, and than that in the halls of the Conservatoire des Arts et Métiers, at Paris.

Inundation from the Nile. — The damage by inundation on the Damietta branch of the Nile is estimated at $2,500,000. Two hundred and fifty lives have been lost. The Government is accused of neglecting all precautions against such a calamity.

Excavating the Temple of Delphi. — It is said that the Athens Archæological Society is in treaty for buying up the houses on the site of the Temple of Delphi, and transferring the village to a short distance off. Excavations will then be undertaken.

Lacustrine Relics. — On the site of the lacustrine village near Estavayer, laid bare by the lowering of the waters of the Lake of Neuchatel, have been found amber ornaments belonging to the age of stone, and a beautiful golden buckle of the age of bronze. Four canoes are visible, but they have not as yet been raised to the surface.

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CONTENTS.

SUMMARY:—
The Architects' Convention at New York. — Papers and Debates. — Resolutions concerning Competitions. — The Supervising Architect's Report. — Relation of Architects. — The Paris Exhibition. — Mr. Leighton and the Royal Academy 169
THE TWELFTH CONVENTION OF THE INSTITUTE 170
MR. WALTER'S ANNUAL ADDRESS 172
THE ILLUSTRATIONS:—
Country House at Concord, Mass. — Municipal Offices, St. John, N. B. — House in Boston. — The Extension of Harvard University Library, Cambridge 172
ART STUDIES 173
HINTS ON BUILDING CHIMNEYS 173
CORRESPONDENCE:—
Letter from Hartford 174
FAILURE OF CONCRETE FLOORS AT CAMBRIDGE, ENGLAND . . . 174
COMMUNICATION:—
Elevated Railways 175
HOW THE FRENCH GOVERNMENT BUYS PICTURES 175
MODERN ILLUSTRATED BOOKS 175
NOTES AND CLIPPINGS 176

THE twelfth convention of the Institute, of which we have given a fuller account elsewhere, was duly held in New York on Wednesday and Thursday of last week, in the Corn and Iron Exchange, whose juxtaposition with one of the stations of the Sixth Avenue elevated railroad gave the members from abroad a fair experience of both the virtues and the vices of the new mode of transit. It was not a full convention, the attendance from other cities being small; nor a long one, being limited to two days and three sessions. The reports of the officers made only a fair showing for the past year: the membership having remained pretty nearly stationary; the expenditures leaving a small balance on the right side, owing to the omission of the usual publication of the Proceedings; and the active work accomplished during the year having been less than usual. The Board of Trustees reported that efforts on their part to influence Congress in favor of government tests of building materials had proved ineffectual, and they had laid the matter on the table. The presidents of the chapters had been appointed a committee on the credentials of new members. The resolution of the Committee of Ways and Means revising the method of collecting the revenue, passed by the last convention, had been rejected by the chapters. The New York Chapter reported from their committee on the legal status of architects a decision of the courts which involved the denial of the protection of the lien law to architects, the case decided being actually that of an engineer, but showing by implication that no such protection was given to professional men, since the law was intended to aid laborers only. The Boston Chapter presented a resolve ratifying the resolution proposed by the Committee of Ways and Means, and asking that the committee be made permanent. They also reported the expedition undertaken with the encouragement of the chapter by Mr. Joseph T. Clarke, one of their junior members, for a complete comparative study of all the accessible remains of Greek Doric architecture in Europe and Asia Minor. The Baltimore and Rhode Island Chapters reported indifferent success in their efforts to secure the passage of proper building laws, that of Baltimore being defeated, and that of Providence having been passed after a long struggle (of which we have here and there given an account), but shorn of many important restrictions, and with no satisfactory provision for its enforcement.

THE Rhode Island Chapter presented the draught of a law imposing a fine of a thousand dollars and a term of imprisonment upon any architect, engineer, or superintendent whose building should fall down or fail to perform its use during five years after it was built, provided that he had full control of its construction; and a like penalty upon any contractor or builder who should provide any building material whose failure should cause loss of life, unless he could prove that he carried out his instructions exactly. This was followed by an able paper on the legal liabilities of architects here and abroad, by Mr. T. M. Clark, and led to an animated debate, some members arguing in favor of the most rigid accountability, and decrying building laws; while others demanded a qualification which should exclude incompetent architects from practice; and others called for a careful discrimination between the responsibility of the architect and that of the builder. The subject was dropped without action or expression of opinion from the convention. The president, Mr. Walter, read, besides his annual address, a very interesting memorial of his predecessor, the late Mr. Richard Upjohn, which it was voted should be entered upon the minutes of the Institute, a copy being sent to Mr. Upjohn's family. A paper by Mr. Littel on the use of brick in decoration provoked considerable discussion on the relative value of brick and terra-cotta as building materials; and others were read, on the metric system, on the faults of American architecture, and on plumbing. A report was received from the Committee of Ways and Means, suggesting the value of a technical examination as a qualification either for membership or for professional practice, and proposing means to secure the interest of the younger members of the profession by prizes or other appeals, and to increase the importance of the conventions. The other things which occupied the convention were chiefly matters of domestic business or discipline. The old officers and committees were reëlected with a few exceptions, of which the chief was the election of Mr. Charles D. Gambrill as secretary, in place of Mr. McKim, who declined to serve another year.

ANOTHER subject which led to considerable discussion was the conduct of architects in competitions. The following resolutions were passed:—

"That any member of this body who, in case of competition, should propose or agree to undertake the work for which he is competing for a less commission or compensation than his fellows in the competition violates the sole condition of membership in this society, viz., 'the honorable practice of his profession;' and that upon proof of the fact to an investigating committee, which shall consist of three Fellows, who shall be appointed by the Board of Trustees upon the demand of two Fellows of the Institute, he shall be declared to be expelled by the Board of Trustees, without further action of the Institute as a body, and that such expulsion shall expel him also from the chapter."

"That if in case of paid competition any member of this Institute shall offer his services free of charge, he shall be liable to censure, if charges are made by two Fellows and a committee appointed as provided in a former resolution, for censure for violation of the conditions of membership in the Institute."

THE papers give short abstracts of the report which the Supervising Architect has just made to the Secretary of the Treasury. The notices that we have seen are very meagre, but we make out from them that the usual obstacle of insufficient appropriations has made it impossible to carry on much of the work to advantage, so that several of the buildings — the custom houses at Hartford and Fall River are quoted — must as usual be stopped, almost as soon as work on them is fairly resumed, for want of funds. The office is being gradually relieved of the last of the fifteen per cent contracts, those for cutting the granite of the Hartford Custom House and the Boston Post Office extension having been modified during the year, so that the work will henceforth be paid for according to measurement. The Boston building is reported as advancing satisfactorily. It is expected that before the season closes the stone-work of the first story on all the fronts will be set; and a contract has been made for the iron columns of the basement and the beams of the first floor. The amount of the balance in hand, three hundred and forty thousand dollars, allows one to hope that it may be possible to keep the work going till the next appropriation is available.

THERE is so much persistent talking about the removal of Mr. Hill that there must be a strong effort making to displace him. We cannot pretend to any familiarity with the matter, but the movement seems to have grown out of the Chicago Custom House quarrel and to be a purely local one, while the unofficially appointed successor is a Chicago man. It is safe to say, without assuming to be well acquainted with a question of which we do not know the ins and outs, that we have not seen indications of any but local dissatisfaction with Mr. Hill's administration of his office, nor have we heard of any well-sustained accusations of unfitness, by reason either of incompetency or of unfaithfulness. Indictments have just been brought against him and others for fraudulent dealing about the Chicago Custom House, but they look as if they were aimed somewhat at random, since they include no less than eight persons, among whom is Mr. Hill's predecessor, now for the first time attacked. Moreover, it does not tend to give confidence in the fairness or disinterestedness of

those who are working for the removal of a prominent official, that they should have a candidate in hand ready to push into his place as soon as it is vacant. The professional officers of the government are those who more than all others should hold their positions without dependence on politics or cliques. The Supervising Architect, especially, is an official who should be as permanent as possible, in order that the traditions of his office and the continuity of his work should be as little interrupted as possible. There is perhaps no work undertaken by the government which is so likely to be marred in passing from hand to hand as its architecture, because it is never finished, and one man cannot without peculiar difficulties take up the artistic work which another lets fall. Mr. Hill had the exceptional advantage of coming to his position thoroughly familiar with the traditions of it, and even with the details of the work actually in hand, having had a long training in the office itself. To supplant such a man by a novice is prudent only when he has shown himself incompetent or dishonest; that any private person or coterie should assume to urge a successor of their own selection into his place could at most be justified only by conspicuous and commanding ability of the candidate.

The French Exhibition has been closed a fortnight after the time first appointed. There has been more or less complaint against the management of it, particularly in respect to the awards,—a thing which, for that matter, is always to be expected. People have found fault because the awards were so long in coming, and because when they came they were cheapened by being lavishly and indiscriminately distributed. In spite of the warning of Vienna and the good example of Philadelphia, the inn-keepers and conductors of Paris, and the shop-keepers according to their opportunities, combined to make the way of the visitor hard. The want of suitable restaurants at the Exhibition itself was another thing that gave serious annoyance. But with all these drawbacks the Exhibition has undoubtedly been, as it was meant to be, the most attractive that has yet been held, on account of the splendor of the display and the magnificence of its buildings, as well as the brilliancy of the city which gave it. It has probably proved somewhat more costly and less directly remunerative than was anticipated; but the French expected to pay liberally for it, and were not in the humor to criticise the cost too sharply. The expenses were estimated in advance at something over thirty-five millions of francs; what they have amounted to is not yet told. It was assumed that the receipts from visitors would be fourteen millions of francs; they are reported at somewhat less than thirteen millions. The receipts at Philadelphia were greater by half; but the admission fee at Philadelphia was a half a dollar, while at Paris it was a franc. The proceeds of the concessions (for restaurants, catalogues, and the like) were counted at a million and a quarter, and with an allowance of four millions for the sale of the buildings, it was concluded that the immediate deficit would be about twelve millions; which, however, was to be more than made up, it was thought, by the increased revenue from postage, telegraphic despatches, various imposts, and the reduction in subsidies to railroads. The receipts from the sale of the buildings will probably not help the deficit much, for that on the Trocadéro was built to be permanent, and now it is decided that the great building shall remain also. The Champ de Mars, where it stands, has always been considered the inalienable parade ground of the Ministry of War, which has vigorously pressed its claim to recover possession, it is said. The Ministry of Commerce, however, has fought hard to defend its building, and has secured a compromise, in virtue of which, we are told, the building is to be preserved. Already we hear of a movement to prepare another American exhibition, this time in New York. We might hope that the next American exhibition would be under government authority, if we could be sure of honest management. To undertake it under private or local authority is quite at variance with the idea of an international exhibition, and must be a disadvantage to it, however honest and public-spirited the management may be. This was the rock on which the Philadelphia Exhibition almost split.

The Royal Academy has this time chosen for its president a painter whose reputation does honor to the selection. The new president is Mr. Francis Leighton, who would probably be accounted, by more people than any other, the first English painter of our day. Americans who studied the paintings at the Centennial will be likely to remember him by two strongly contrasted yet in some way analogous pictures shown there, the "Egyptian Slinger" and the "Summer Moon." He is one of the few English painters who have tried in this day to keep to the walks of what is called "high art," eschewing pretty much all subjects from the actual life of his day and generation, and confining himself to the works of a poetical and somewhat severe imagination. A certain early tendency toward purism was in keeping with his choice of Steinle, of Vienna, the follower of Overbeck, for his master, and Ary Scheffer for the companion of his later studies. His father, it is said, gave him up rather reluctantly in his youth to the study of painting, influenced by the advice of Powers, the sculptor, to whom he had referred his case. This decided, his training, which was long and thorough, was mostly German. He studied first in Berlin and then in Frankfort, spending afterwards some years in Rome. The first picture which brought him reputation was, characteristically, a picture of Cimabue carrying his painting of the Madonna in procession through the streets of Florence. The subjects of his other works show the imaginative bent of his mind. Among them we find "Dante in Exile," "The Triumph of Music," "The Fisherman and the Siren," "Paolo and Francesca," "The Star of Bethlehem," "Ahab and Jezebel," "Helen of Troy," "The Syracusan Bride at the Temple of Diana," etc. He was commissioned a short time ago with Mr. Poynter to solve the ever-recurring problem of painting the interior of St. Paul's. He was made an Academician in 1869, and is now forty-eight years old. He is said to be as distinguished for his social qualities as for his artistic achievement,—a distinction which is held to be a *sine qua non* for the post for which he has been chosen.

THE TWELFTH CONVENTION OF THE INSTITUTE.

The twelfth annual convention of the American Institute of Architects, held in New York last week, though it called out some animated debates, does not seem to leave behind a great deal to record. This is perhaps partly because the attendance was smaller than usual, and among the absentees were a number of members who have usually lent efficient help to the proceedings; partly because the various officers and committees of the Institute had provided less material than usual to be acted upon; and also because cutting down the exercises to two days, instead of three, which is the time-honored length, left scant room for the handling of the subjects that were and might have been presented. There were in fact but three sessions, instead of five or six, as has been the usual custom, so that several of the more interesting matters were dismissed, either without a satisfactory discussion or without decisive action; while others which might have been discussed with profit were passed with a mere mention, and one paper on an important subject, which was presented late in the proceedings, was necessarily put on record without even being read, for want of time. A well-considered and well-arranged programme and the starting of several questions of professional importance made the sessions interesting, nevertheless.

Of literary matter in the shape of essays and special reports there was as large a proportion as usual, we should say, and probably as interesting; while the manner in which it was introduced, distributed, as it was, pretty uniformly among all the sessions, was perhaps as effective in securing attention and promoting discussion as any, though it does not tell so much in the retrospect as if it had been massed together in distinct sessions. Besides the president's annual address, which we print elsewhere, his sympathetic memorial address on the late president, Mr. Upjohn, and Mr. Clark's excellent essay on the legal responsibilities of architects were the two papers which showed careful and deliberate preparation, though there were short papers of interest from several of the members present and absent on the subjects proposed in the programme.

The reports of the officers and committees showed little change in the conditions of finances and membership. There had been but few elections and two or three withdrawals during the year, leaving the number of Fellows at sixty-five, and Associates seventy-two. The result of cutting down the annual assessments in the last two years was shown in the fact that, notwithstanding the failure to publish the Proceedings of the Eleventh Convention during the year, the revenues had barely sufficed to cover the expenditures, the balance in hand at the end of the year being less than that at the beginning, and it being thought necessary, therefore, to levy a special assessment to provide for the publication of the proceedings of that convention and the present one. The scheme of finance provisionally adopted a

year ago by the convention was reported as rejected by the chapters. This leaves the Institute — after the general assembly has cut down the assessments, without regard to the requirements of its usual expenses and what is considered its necessary outlay, and has rejected the means provided by which it could exercise control of these expenditures — to a choice between two or three rather unsatisfactory alternatives. These are, to go on with a revenue which obliges it to forego something of its proper efficiency; or to provide for annual deficits by a special assessment, as has been done this year; or to again increase its regular fees.

The most important question of practical bearing discussed was that of the responsibility of architects for the failure of buildings put up under their direction. This was introduced by a draught of a general law proposed by the Rhode Island Chapter, which provided that the architect or superintendent of a building should be held responsible under severe penalties for loss or injury due to the failure of his work, unless it proved that it was not carried out according to his intention, in which case the responsibility should pass to the builder. Mr. Clark's paper on the Liability of Architects also turned discussion in the same direction, citing the practice of the French courts, which holds the architect and builder to a joint liability, — apportioned according to the evidence of fault in each case, — as distinguished from the English and American habit, which allows the client or injured person to attack whichever he chooses, a privilege that is apt to lead to the discomfort of the architect and the escape of the builder. The discussion showed considerable variety of opinion, there being, however, a pretty general agreement as to the importance of holding architects to a strict accountability for the quality of their own work, with symptoms even of a generous readiness to accept liability for the faults of other persons as well as their own. One speaker argued against the restraints of specific building laws, which, being made to suit a particular class of cases, as he had found by his practice in New York, were an actual hindrance to satisfactory construction in others; so that a building might, he thought, be built in exact accordance with the law, which would infallibly fall down. He therefore favored the enforcement of individual responsibility rather than of restrictive laws. It was time, another urged, that the law stepped in to teach persons who dared to add "architect" to their name the weight of the responsibility they assumed; and he thought the penalties to which architects were liable could not be too great, so that incapable pretenders might if possible be prevented from assuming their duties. A third held that the public was ready to take care of itself, and that there was no reason why architects should interpose to provide protection for it by urging legislation. If it were desired to eliminate incapable men from the profession, it was better to begin at the other end by establishing some standard of qualification, and not allowing unqualified persons to practise as architects.

The general course of the debate showed that while the liability of architects was sufficiently well recognized by them and by the public, and unhesitatingly enforced on occasion, the profession itself had no very definite idea of the limits of liability or the best way of enforcing it. The discussion, in fact, drifted away from what was the chief point brought forward in the Providence resolution, and suggested by Mr. Clark's paper, the point which we think most needs the attention of architects, — the discrimination between their liability and that of the builders who work under them. At present the American practice seems to hold both of these persons liable, and as against the public the owner also, and to visit the wrong, where an injury occurs, upon whoever happens to be nearest or most visible or most solvent. Among these three the builder, being usually the least conspicuous, is most apt to get off free. When the architect is to be held as first hostage, as some of the speakers at the convention seemed to wish him to be, the kind of superintendence which this position requires from him ought, it seems to us, to be clearly distinguished from that which is tacitly understood, given, and accepted in the conduct of ordinary work, and the fee for it ought to be considerably greater than is allowed in the regular schedule of charges. As for the building laws, it must be remembered that though skilful constructors would be more comfortable without them, and may even be impeded by them in their development of actual improvements, it is not they who are aimed at by them; and it is more for the general good, since, as one speaker remarked, the laws cannot be made elastic, that a capable architect should now and then be hampered by them than that cheap Jack, who has no fear of responsibility, and who does five times as much building, should be allowed to do it at his will. After a pretty animated debate, the convention let the subject fall without action.

The most important resolutions adopted by the convention were those which we have quoted in another column, touching the conduct of members in competitions. If there are in the Institute such offenders as these resolutions would touch, it would be well to make an example of them. How great readiness there would be among their fellows to pursue them to conviction remains to be seen; but to do it would undoubtedly strengthen the Institute as well as do something to abate a scandal. Another question of practice, which was referred to the Board of Trustees, was suggested by the letter of a member of the Boston Chapter, who complained of the provision in the published schedule of charges, that the whole fee or commission on "stores" shall be three per cent. This certainly is a hardship to the architect, unless "stores" is defined to mean plain warehouses or something like them; for, as the writer urged, the greater part of buildings which are nowadays put up in our cities under that name require from the architect as much care and design, in proportion to their cost, as dwelling-houses, churches, or public buildings.

The paper which led to most discussion on more technical subjects was that by Mr. Littel on the Use and Abuse of Brick in Decoration, in which the writer discountenanced this use of brick, and favored the employment of stone for the ornamental parts of buildings, on account of its superior breadth and solidity. The debate turned chiefly on the advantages of terra-cotta and moulded brick as building materials, and of carving in brick-work. One member objected to moulded bricks on the ground that their lines were always coarse and unsatisfactory, and that being moulded on the ends they gave only members of four inches wide, and so tended to monotony of scale, — all of which may be true as concerns the inferiority of brick to stone for the finer uses of building, and yet leave a wide range of work in which it can be employed to good purpose. In favor of carved brick the point was made that it had an advantage over terra-cotta inasmuch as it could be carved in its place; a process which its advocate said he always employed in stone carving, that he might see the effect of his work as it went on. To this the advocates of terra-cotta replied that the clay could be carved or modelled in its place and burnt afterwards, and added, fairly enough, that it was a more reasonable proceeding to carve the clay before burning, when it was soft and tractable, than afterwards, when it had become hard and intractable. The arguments were furnished by a small number of those who were present, and there was nothing to show what the prevailing opinions were; but we fancy there will not be much dissent among architects from the general doctrine that natural stones are the first of materials for sculpture; that terra-cotta is an economical substitute, which deserves respect for its serviceableness and durability, and lends itself well to artistic effect; and that brick, even when made of special quality for the purpose of carving, must be regarded as a rather ungrateful *pis-aller*.

The conventions are the mainspring of the Institute, so far as it acts distinctly from the chapters, and every one who is interested in the welfare of the Institute should do his best to strengthen them. The most efficient means to this end is careful and early preparation. If the programmes for them could be laid out some months beforehand, instead of two or three weeks, and members could be induced to inform themselves upon and consider the topics which were to come up in them, a good deal of hasty writing, uncertain action, and rather unconsidered discussion might be exchanged for what would be of more permanent value and influence. As it is, the conventions are apt to wear an air of impromptu disputation, which takes something from the weight of their conclusions, and makes it difficult to direct their force effectively. Not that the impromptu element should be banished: it is valuable as giving life and flexibility to the deliberations of any assembly. But it would be well if it could be more solidly weighted with the influences of serious preparation. This would certainly give more effect as well as greater steadiness to the action of the conventions. It would allow a chance to correct the false perspective of hasty debating, and to turn their chief energies to their most important concerns. We know how difficult it is for busy men to give their attention to any occasional work before it is absolutely required; nevertheless we commend this view to those who are to have the next convention in charge.

THE TWELFTH ANNUAL CONVENTION OF THE AMERICAN INSTITUTE OF ARCHITECTS.

PRESIDENT WALTER'S ADDRESS.

Fellows and Associates of the American Institute of Architects, — These conventions mark the progress of our art, and tend to its development and advancement; their recurrence is, therefore, to be regarded as occasion for congratulation and fraternal greeting, in the interchange of which I take pleasure in meeting you to-day. We have assembled to hold our Twelfth Annual Convention, which, to us as professional architects, is an occurrence that we should highly prize, and endeavor to make the most of. The business that will come before us relates to the best interests of the profession, and it is expected that each one of us will have something to impart that will add to our general stock of knowledge; it therefore becomes us, in this connection, to "be ready for every good word and work."

We have been guarded and guided by Divine Providence since we last met in convention, and this we acknowledge with gratitude; at the same time we are called to bow with submission to a very great affliction, — our late beloved President, the venerable Richard Upjohn, has gone to his reward. He departed this life on the 17th of last August, at his picturesque home at Garrison's-on-the-Hudson. I shall not now allude further to this irreparable loss, but at the request of the Board of Trustees of the Institute, I shall read a separate memorial paper on the subject to-morrow, during the morning session. We shall therefore turn for the present from the dead to the living.

The progress of architecture during the past year has been quite in sympathy with the times. A period of financial depression, such as our country has passed through since our last annual convention, is by no means calculated to promote the development of architectural science. Some works of importance have been commenced, but not many; and others that were begun in better times have continued in progress of execution, with satisfactory results.

Much has been done during the year in our large cities, in the construction of residences and buildings for business purposes, the most of which bear the impress of independent thought in architectural composition, and it is not to be doubted that the development of the genius of design is becoming every year more apparent.

While it is true that we, as architects, recognize with satisfaction the progress of our art, it should be borne in mind that we do not expect everybody to admire what everybody else does; our tastes, fortunately, differ in regard to the aesthetic handling of most of the works that come under our notice; but that difference is the life of our art. If, in the processes of architectural design, we all thought alike, our works would be devoid of individual inspiration, and a wearisome monotony would pervade all manner of buildings. It is therefore well for our art that differences of opinion in matters of taste exist among its professors, provided the individuality that characterizes our respective works is the outgrowth of genius and cultivation.

We have, unfortunately, some specimens of building in our principal cities, which, so far from exhibiting progress in the artistic manipulation of material forms, remind us of the primitive efforts of a barbarous age, carrying us back to Ellora, Elephanta, or Uxmal; it is, however, a satisfaction to know that such eccentricities are comparatively few.

As the masses of the people become more imbued with intelligent conceptions of art, whatever fails to develop the *good*, the *true*, and the *beautiful* will cease to be tolerated. After all, it is to the education of the public mind in what constitutes the genius of architecture, that we are to look for the suppression of crude and inartistic building, and the promotion of a taste that will do honor to the age in which we live.

But little has been done by the Institute during the past year in promoting advancement in the professional practice of our art. The general stagnation of all kinds of business has had the effect of causing a falling off of the members in their attendance at the meetings of the respective chapters, and a general loss of interest in scientific research.

If we fail to bring our minds and energies to bear upon whatever relates to the advancement of our profession, and to keep the machinery of our organization in active operation, we shall undoubtedly lose ground with the public and come short of the elevating and ennobling influences to which our art is addressed.

We shall not, however, despond. Business men say that stagnation in trade has "touched bottom," and that better times are before us; let us then partake of the influences of the revival in business, in commercial circles, and apply ourselves, now and onward, to the promotion of all that relates to a healthy architectural progress.

In the works of the recent past a decided improvement in the structural character of buildings is noticeable. More attention than heretofore is being paid to the permanency of foundations and to the scientific elements of construction, thus affording conclusive evidence of the value of the improved architectural training which students now enjoy, and of the increased attention of architects in general to the sciences which underlie the art of building. The pursuit of knowledge in this direction, both in and out of the profession, is, no doubt, mainly to be attributed to the Institute and its chapters.

It is, however, to be regretted that we are not yet without occasional examples of imperfect building, some of which have resulted in serious disaster; but it should be remarked that in most, if not in every instance, the faults have been traced to unskilful superintendents and unreliable contractors, rather than to the architects from whose plans they were constructed, and who in most instances had no control over their execution.

Architects are frequently called upon to furnish designs for buildings, with detail drawings and specifications, with the understanding implied or expressed, that in order to save a portion of the full commission of five per cent on the cost of the work, their services in the direction and execution of the design will be dispensed with; such economy is "penny wise and pound foolish," as it seldom fails to result in defects in carrying out the plans, as well as in a greater expenditure than would have been incurred had their author's design been properly executed; and what is still more, the false economy referred to has, in some cases, resulted in serious disaster.

It must nevertheless be borne in mind that an architect is always considered by the public as responsible for his designs, whether he is employed to see them executed or not. Should they be committed to unskilful hands and be mutilated *ad libitum*, and so imperfectly executed as to result in a want of stability, he need not expect that public opinion will exonerate him from a certain degree of blame, however perfect his design of construction may have been. Not only is the permanency of a structure affected disadvantageously by intrusting its execution to irresponsible mechanics, without professional guidance, but its architectural proportions and appointments are sure to be hardly dealt with.

It would be well for the profession and well for the public if architects would decline to furnish designs, unless it were understood that they are to supervise and direct their execution.

It may not, however, be politic for an architect to insist in all cases on such an understanding; but it is obvious that the fewer drawings he commits to the manipulation of unskilled hands the safer will be his reputation as an architect and the more satisfactory will be his practice.

As the objects which suggest themselves for the consideration of the Institute cover everything that relates to architecture, it is eminently proper that some attention should be given to the subject of the laws which govern the erection of buildings, wherever such laws exist.

The Institute is obligated, by its relations to the building public, to inquire as to the power vested in building inspectors, particularly in our large cities; to ascertain their qualifications for the proper discharge of the duties pertaining to the office, and to inquire into the efficiency of the laws by which they are constituted and governed, and, in case the public safety requires it, to recommend to the constituted authorities, especially of our large cities, such changes in existing laws and the processes of their execution as will insure greater safety to the public, and a higher degree of architectural propriety in the appearance of buildings throughout the country.

Permit me to say in conclusion, that although our professional engagements during the past year may not have been on as extensive and magnificent a scale as we could have desired, we have all, no doubt, added more or less to the architecture of the age in which we live; and it becomes a question for us to consider, whether in our works we have in any degree enhanced the dignity of our profession and the well-being of society; whether we are progressing in a purer, higher style of art; and whether the developments of our genius, as we have embodied them in material forms, have an educating effect for good on the public mind. If such is the result of our doings, we have consciousness of progress to nerve us for the future, and the satisfaction of knowing that the world is the better for our having lived.

THE ILLUSTRATIONS.

HOUSE FOR E. S. BARRETT, ESQ., CONCORD, MASS. MESSRS. PEABODY AND STEARNS, ARCHITECTS, BOSTON.

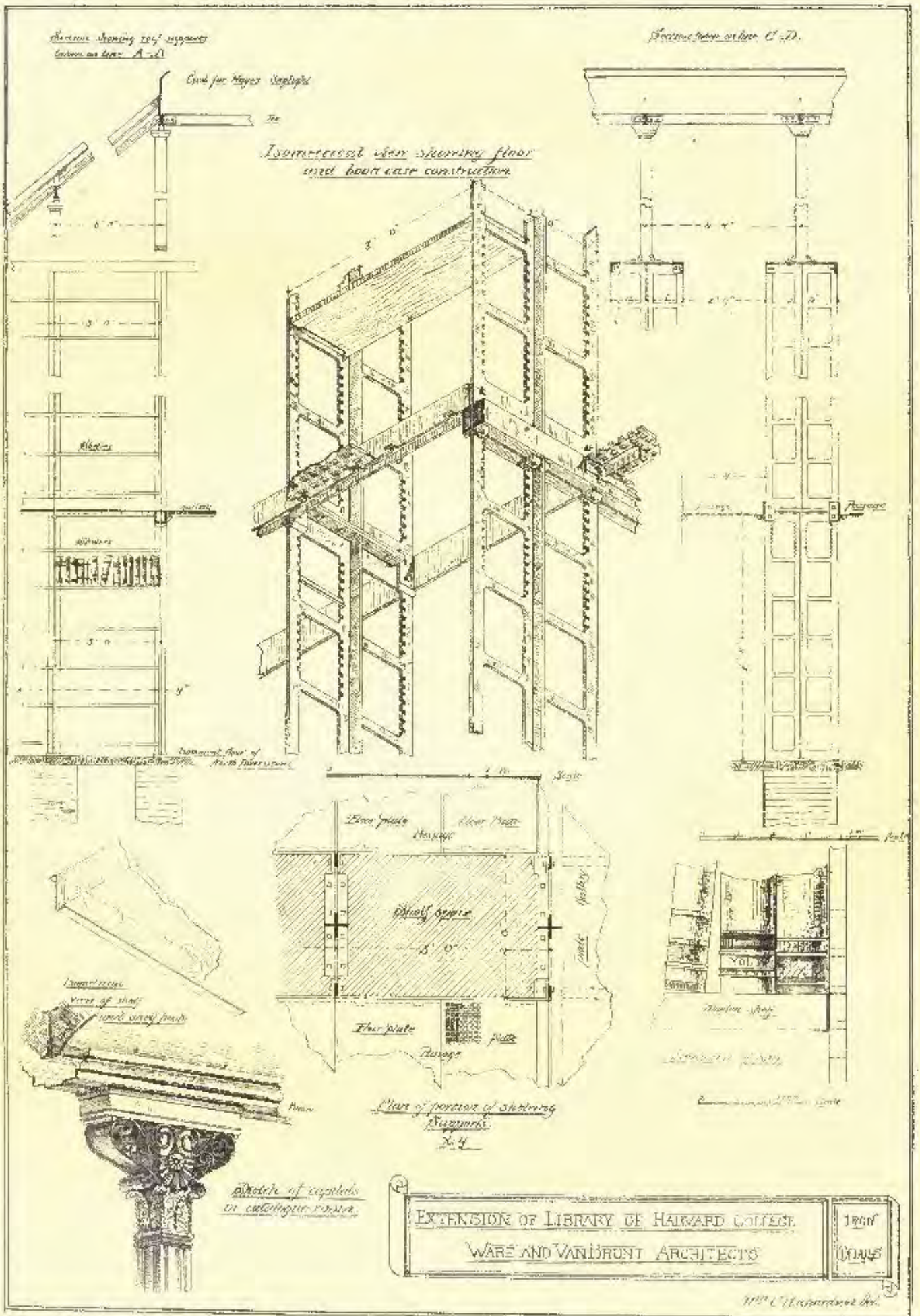
These are three preliminary sketches successively made for this country-house. It is now being built in the main like the large sketch, and somewhat like the small one that shows the opposite sides.

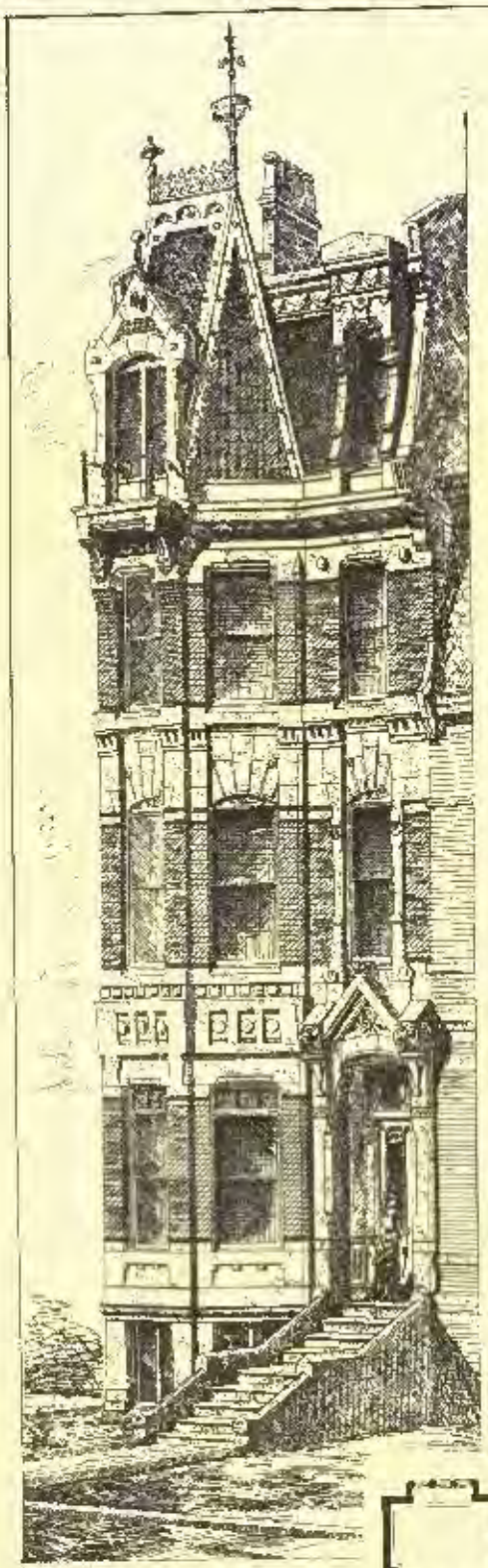
MUNICIPAL OFFICES, ST. JOHN, N. B. MESSRS. McKEAN AND FAIRWEATHER, ARCHITECTS, ST. JOHN.

HOUSE ON COMMONWEALTH AVENUE, BOSTON, MASS. MESSRS. KIRBY AND LEWIS, ARCHITECTS, BOSTON.

DETAILS OF THE NEW EAST WING OF THE LIBRARY OF HARVARD UNIVERSITY, CAMBRIDGE, MASS. MESSRS. WARE AND VAN BRUNT, ARCHITECTS, BOSTON.

This design is intended to meet the complicated service of a great library, according to the new conditions of the cataloguing, distribution, storage, and delivery of books. The book-room is divided into seven stories, each seven feet high, by floorings of open iron gratings, resting upon a series of transverse bookcases, also of iron, two feet and eight inches apart, arranged to facilitate the more economical and compact storage of books, and their scientific distribution upon the shelves, so as to be most readily accessible to the officials of the library. The structure is wholly fire-proof, and is divided from the old library by fire-walls. It is intended to arrange the old library for a reading-room for the students of the university. The new book-room will accommodate from two hundred and fifty thou-

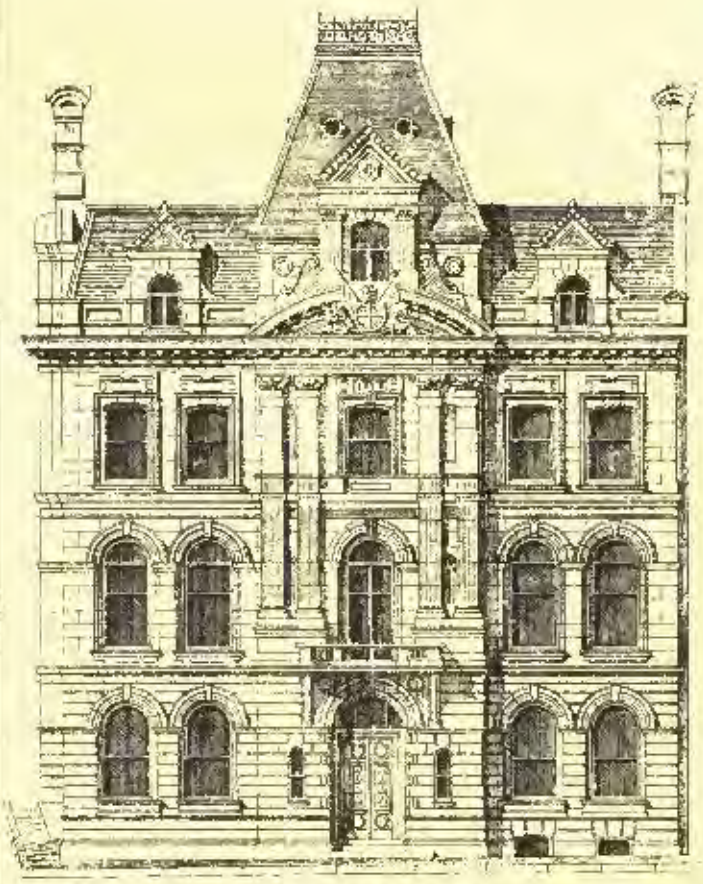

Isometrical view showing floor and book case construction
Plan of portion of shelving
Sketch of capitals in cataloguing room.
EXTENSION OF LIBRARY OF HARVARD COLLEGE.
WARE AND VAN BRUNT ARCHITECTS



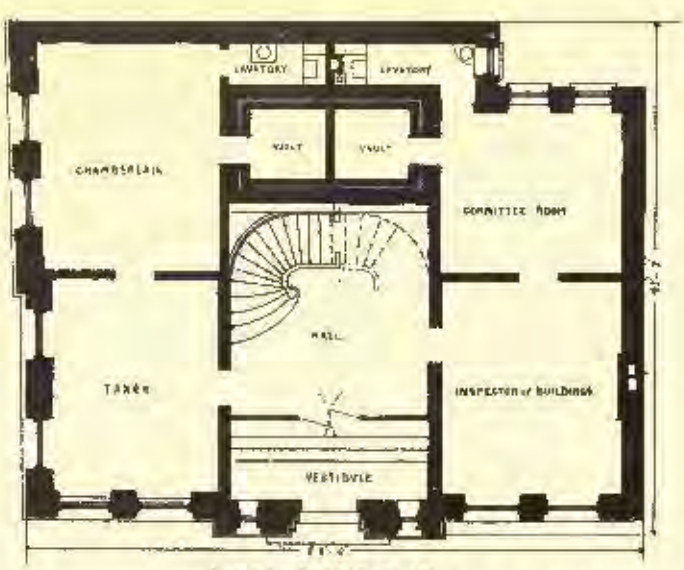
House · · on · Commonwealth Ave. · Boston ·

Kirby & Lewis · Archts ·
C. Pemberton Sc.

MUNICIPAL OFFICES
— SAINT JOHN N.B. —

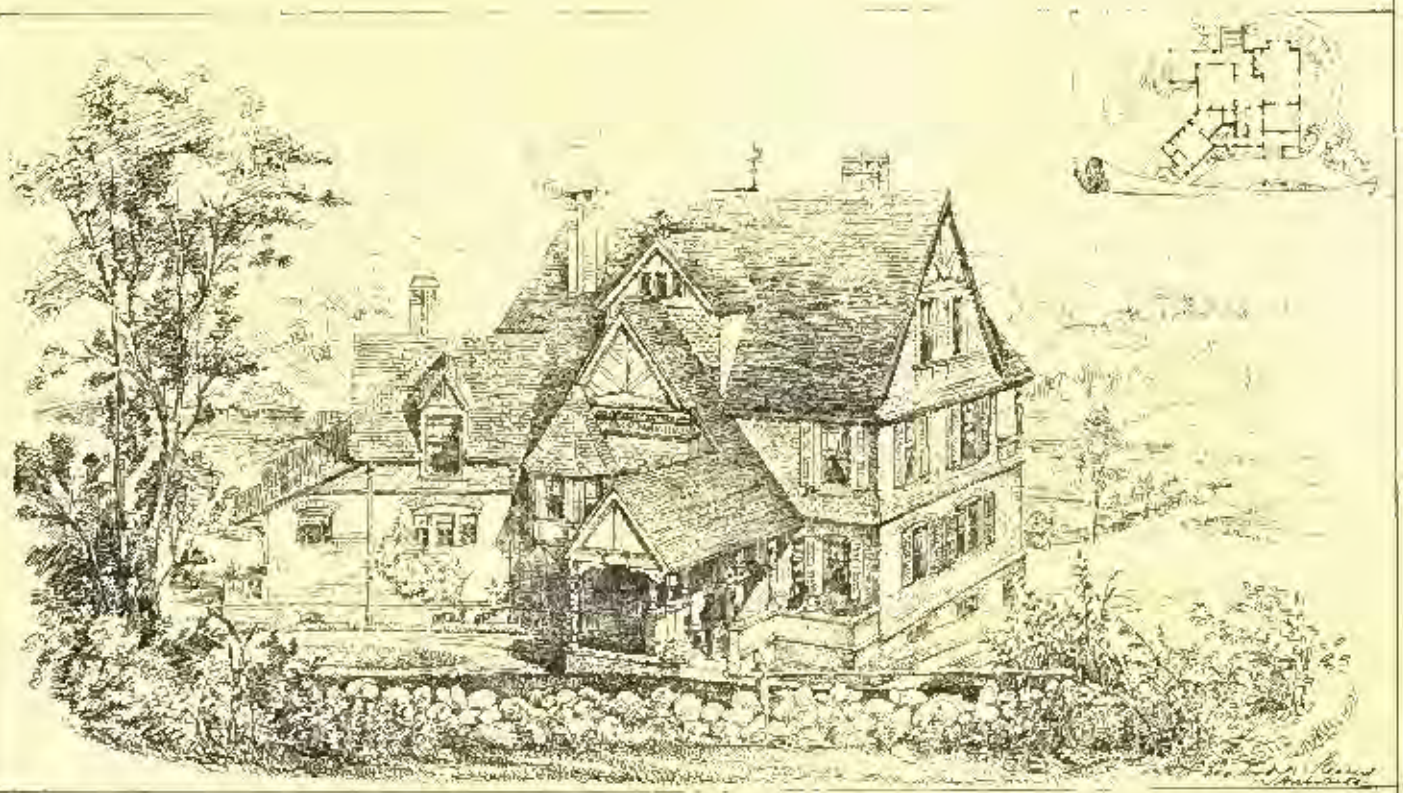


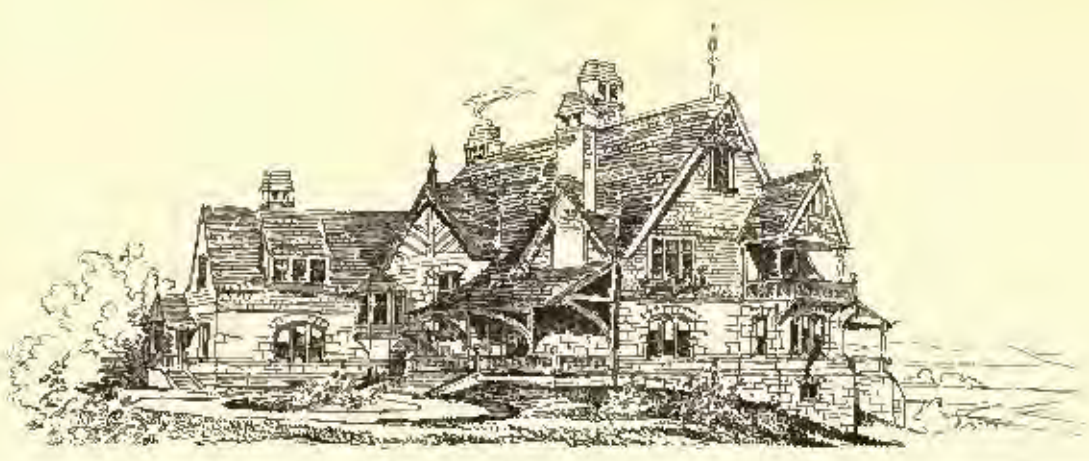
— FRONT ELEVATION —



— FIRST FLOOR PLAN —

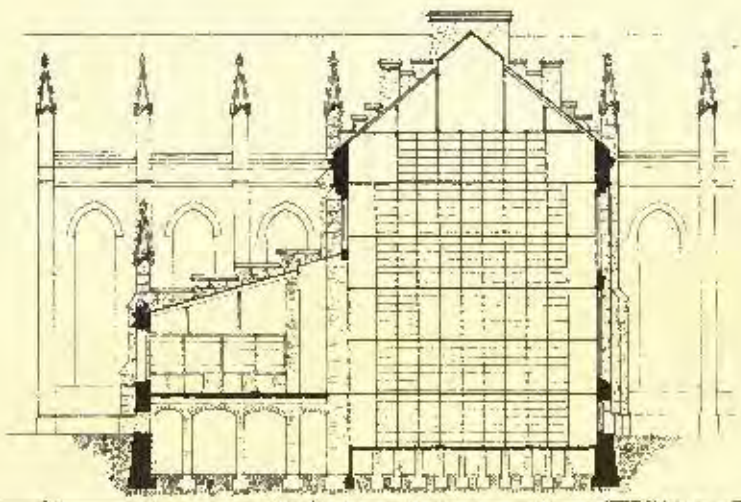
THE HELIOTYPE PRINTING Co. 330 DEVONSHIRE ST. BOSTON.





PRELIMINARY SKETCHES, FOR A COUNTRY HOUSE
PEABODY & STEARNS ARCH'TS.

THE TICKNOR PRINTING CO. 211 DEVONSHIRE ST. BOSTON



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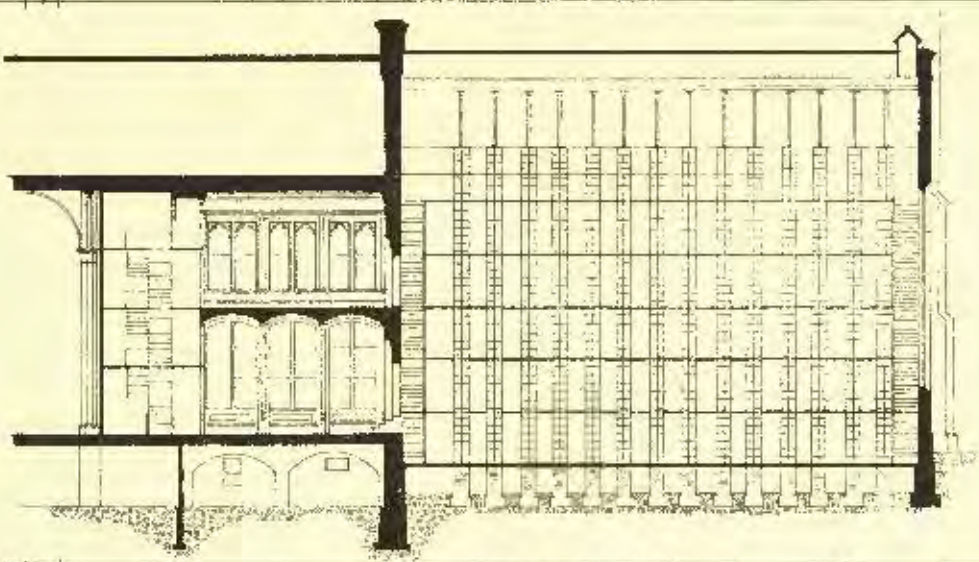

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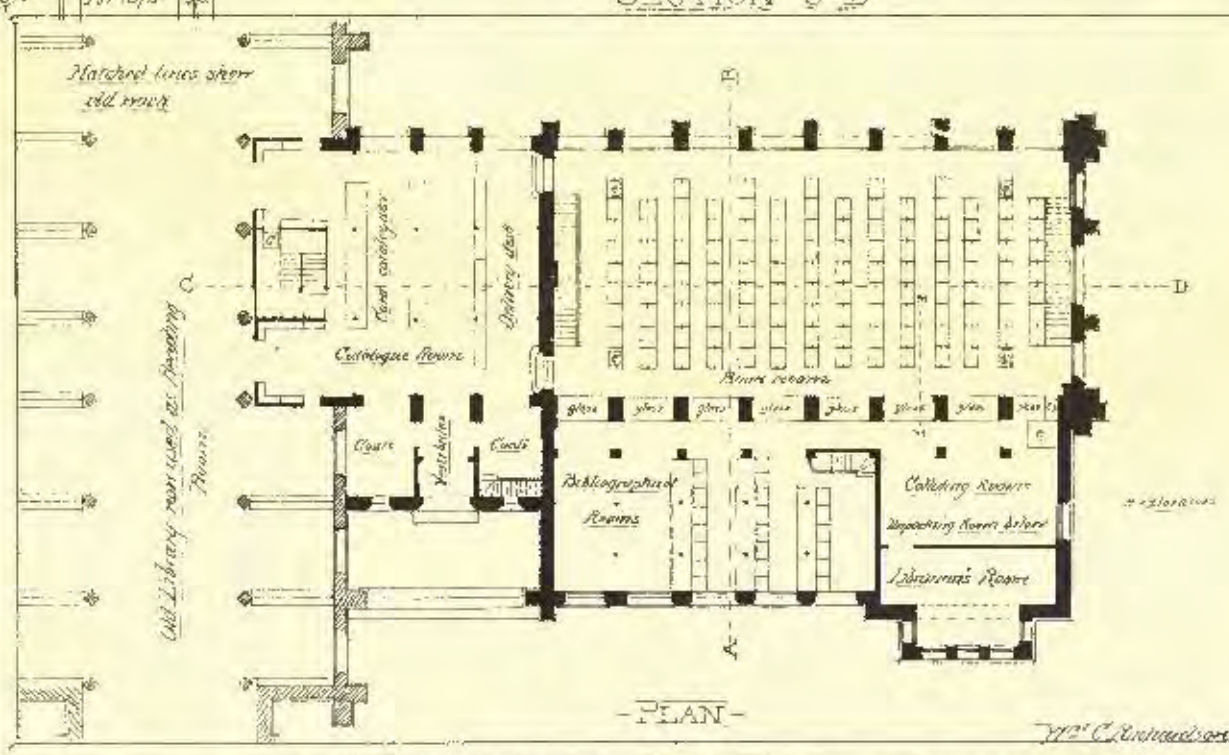

PLAN

Wm C. Richardson, Del.

EXTENSION OF LIBRARY OF HARVARD COLLEGE — WARE & VANBRUNT — ARCHTS —

THE HELIOTYPE PRINTING CO. 283 DEVONSHIRE ST. BOSTON.

sand to three hundred thousand volumes. Accommodation is provided in the south aisle or lean-to for the bibliographical department, at present carried on with from fifteen to twenty assistants.

ART STUDIES.

PROFESSOR COLVIN recently told the students of the Brighton School of Art that: —

They must remember that to learn to draw, paint, and model up to a certain point was very far indeed from learning to be an artist. The profession of an artist, as he understood it, was to follow one of the greater and higher branches of the fine arts, to produce pictures or statues that should be things really worthy for cultivated beings to look at, and capable of giving them the higher kind of pleasure which it was in the nature of sculpture and painting to give. He said, and with all seriousness, without meaning disrespect to any one, that of those who practised these arts as a profession at the present time in England, or in any other country of Europe, the larger part had much better not have practised them at all. He did not say that they had better not have learned to draw. Far from that. But he meant that a picture was not worth painting, and a statue was not worth modelling, and that neither was worth looking at, unless they attained a certain degree of excellence. The curse of modern art exhibitions, and of the quality of modern art generally, was this: that it was fairly dexterous, and showed a certain amount of skill, but was not good enough to have any sufficient reason for existing. He was very glad to hear that some agreed with what sounded rather a hard saying. He did not wish to quarrel with the present century, which was one of most interesting that ever existed, and had deserts of its own. But he did want to face and realize those conditions which necessarily altered altogether the character of our art in comparison with that of the ages which we were justly accustomed to think of as the great ages of art.

In the Greek age or the mediæval age there was no subject which man could think of which he did not view in a fashion that suggested images of art and images full of awe and worship, conceptions of the kind which most raised and inspired the faculties of the artist to high contemplations, and to the production of whatever likeness of Divinity he could imagine. The ancient Greek with his religion, which invested all the forces of the world with human forms, could positively not carry on any of the ordinary occupations of his life, could not think of anything or do anything at all, which did not suggest to him a statue. This was one instance of the manner in which the Greek's way of looking at the world turned all the accidents of his life to forms of art. If a rich Greek had been sick, and had come — as the rich Englishman comes to Brighton — to a place in Thessaly famous for its fine air, and had got well, he would acknowledge his recovery by ordering a bas-relief, in which would be figured the god Æsculapius and his daughter Hygiea, the goddess of health. If he had been out at sea and had had a narrow escape from a storm, he would similarly dedicate a work of art to Neptune, the god of the sea. All that we recognize as realism, or *genre* painting, and most of our portraiture, hardly existed at all in the great day of Greece. Jumping the interval to the mediæval ages, there was to be found a similar sort of conditions. The painter of the Middle Ages was not set to choose from the life of every day his own subject, to illustrate something out of a novel, or to catch at something which had pleased him in the street; he was not set to invent a new subject every time he wrought; but he was set to paint at one or another of that cycle of subjects on which all the higher and more solemn thoughts of men were fixed, — the cycle of the Christian religion, with its Divine and the attendant figures. The concentrated efforts of many generations of painters were spent in giving to these prescribed and uniform subjects all the sublimity, all the majesty, all the tenderness, which long, devout, and ardent thinking could give them. It was not until the modern school of painting dawned in the seventeenth century with the Dutchmen, that the range of art was, so to speak, thrown open. The artistic mind of Europe thenceforth ceased to move along these narrow lines of definite and prescribed religious conceptions, and spread itself along a thousand tracks, — the tracks of daily existence, of landscape, of *genre*, of anecdote, and the rest.

All that art of ordinary life and ordinary nature, which was to be seen in the exhibitions of the present day, and which formed the staple of art as we know it, had been invented latterly, — within the last two hundred years. A whole enormous cycle of things, which people used to think of as incarnated in divine persons, or personified in human images, had passed out into the pale and bloodless region of abstract ideas. And with this change there was naturally a corresponding change in art. Art, descending and spreading itself to right and left, became comparatively trivial; as the artist's thoughts were no longer concentrated on some one dominant cycle of ideas, which aroused all his emotions and naturally suggested forms of beauty, so his work lost its high poetic character. If the artist were of a prosaic temperament, he saw what was prosaic in the world, and painted it. We now found fault with an artist if he painted an old subject. We looked always for novelty of invention. And so it came about that the besetting sin of modern art was a prevailing triviality of conception, and at the same time a prevailing commonness of execution. It was no part of his intention to quarrel with the changed conditions of the time. They must accept the fact of art having come down and spread itself over an innumerable new range of subjects. Only let them insist that the work should be really excellent of its kind, that the artist should be a man, born by the power and intensity of his nature, to add something permanently precious to the aspects of every-day life, and carry his skill of hand to a seriously excellent and exceptional pitch. He believed that, when all of us were taught from childhood to draw, and when our eyes were somewhat trained to learn what was really excellent, and to refuse what was only tolerable, we should cease to accept a large portion of the current art of to-day. A greater number of artists of really high power might be thrown up from among the population, but the standard of what would be thought worth having would be very greatly raised. This sounded as an antagonistic and a discouraging result to expect from the spread of the kind of teaching which his hearers were receiving and succeeding in at their school, but he did not think that it was really to be considered as discouraging. He did not at all know how many among the prize winners of the evening might have set their thoughts upon the career of an artist. No doubt some had. Then let them well consider whether they felt within them the true calling and the power for that high career. Many others, no doubt, — some they knew from the nature of the prizes and certificates won, — might not have that intention, but had the intention, at any rate, of following the career of teachers of art, in the sense of teachers of those manual exercises of drawing, painting, and modelling which were the foundation of art. That was a most honorable career, and one certain to come more and more into demand if education in these exercises became almost universal. — *The Architect.*

HINTS ON BUILDING CHIMNEYS.[1]

1. A BROAD, deep, and substantial foundation is necessary, — one that will not settle or be disturbed by frost. If the chimney is built in or rests upon the wall of the basement or cellar, the wall at that point should be sufficiently broad.

2. The chimney should be perpendicular, straight and smooth, without angles, corners, jogs, or contraction, and at no point in contact with wood; with a space of an inch or more where it passes joists, rafters, or timbers, or through floors, ceilings, or roofs, and at least four inches between the back of the chimney and the end or side of the building. Joists should not be masoned in or rest upon or against the chimney wall, but a header well removed from the chimney used for their support. An additional reason why chimneys should be built very strong and entirely free from contact with any wood in the frame buildings of our western country is that they are so often what is known as "balloon frames," so lightly put up that they are always liable to be shaken by our heavy winds so as to cause cracks in chimneys otherwise constructed.

3. The walls of the chimney, when built of brick, should be six, eight, or more inches thick. A chimney with six-inch walls, the inside course set on the edge and bound with brick laid transversely every four or five courses, is nearly as safe as an eight-inch. Where an eight-inch wall is laid it is perhaps better to leave a space of about an inch between the two courses of brick, occasionally binding by laying a brick transversely. A wall of this kind will not heat so as to endanger wood even in pretty close proximity. The chimney should be put up at a time when free access can be had by the masons to every part of its outside, before joists and other timbers have been placed in the way and before the roof has been put on. Four-inch walls are unsafe at the best, and particularly so if there is any truth in the theory that brick exposed to hot air or steam will in time show a larger amount of heat than is at any time in the heated air or steam passing by or in contact with it; that is, if brick will accumulate heat as we know some metals and minerals do. We know of some facts that seem to support this theory. If it is true, many queer fires from furnaces and chimneys will perhaps be more satisfactorily accounted for.

4. There should be openings at the bottom of the chimney and of each separate flue for the removal of soot. These openings should be closed with a heavy iron box or scoop-shaped stopper. If left open the draft will be affected, and besides, there will be danger of fire falling upon the floor. These soot boxes, or scoops, unless made of heavy iron, are liable to rust out, owing to the damp soot and pyroligneous acid.

5. The chimney should be smoothly plastered with a mortar composed of one part fresh cow dung and three parts ordinary mortar. The mixture should be made from time to time, as needed, and applied before it has time to set and become hard. A chimney so plastered will soon present a hard surface nearly as smooth as glass. Soot will not accumulate on the sides of the flue, and the draft will be quite perfect, other things being observed. The draft will be still further improved if the area of the flue is increased one inch every ten feet from the bottom to the top.

6. The flue for an ordinary dwelling fire-place or stove-pipe should have an area of at least 128 square inches for a wood or soft coal fire, and not less than 96 square inches for a grate or stove burning hard coal. Where large wood or soft coal fires are required, the area should be 192 square inches. Each fire-place or stove-pipe should have a separate flue, otherwise you cannot rely upon the draft. If for any cause more than one stove-pipe is to enter the same

[1] From a paper read at the Underwriters' Convention, at Chicago, by Mr. Daniel Morse, of the Home Insurance Company of New York.

flue, the size of the flue should be increased one fourth for each additional pipe.

7. The hearth should rest upon a brick or stone arch. Timber and board foundations are always concealed incendiaries; iron, because of its power to conduct heat, is also unsafe.

8. The throat of the fire-place should be well contracted and pitched forward, so as to be directly over the fire. This will insure a draft, owing to the fact that the part of the atmosphere not passing through the fire, but entering the flue, will come in more direct contact with the heat, and thereby be more highly rarefied. The construction of the chimney being right, the draft is produced by the air being rarefied in passing through and over the fire. This heated and lighter air ascends the flue, while the denser air in the room rushes forward to supply the partial vacuum. [A common but inexact way of putting the case. Eds. Am. Archit.] Sometimes the draft is imperfect, because a sufficient supply of air is not admitted to the room; and in other cases owing to an open pipe or soot-box hole. All openings should be closed with brick and mortar or closely fitted metal stoppers. The modern practice of pasting a piece of paper over an opening should not be permitted.

9. The walls of the chimney, particularly on the back side, where it is concealed from inspection, and at points where the chimney passes near wood, should be most carefully laid, pointed and plastered on the outside. Fires from defective flues where there is no crack usually reveal the fact, if the chimney is left standing, that the wall on the back side, at points passing near timbers through floors or the roof, has not been well pointed and plastered on the outside. Good work has been done only at points or places exposed to the eye, and where there was no danger from fire.

10. The practice, in many cases, of building a water-shed by projecting the brick just above the roof, should not obtain, nor should the chimney at this point be enlarged for any purpose. The projecting bricks in a majority of cases rest upon the rafters or roof boards; and if at any time the chimney below should settle, there will be a crack and by and by a fire. Chimneys thus enlarged above the roof, presenting a massive and substantial appearance, fail to suggest the truth as to the small and cheaply constructed flue below. A word in regard to chimney sweeps and stated periods for cleaning flues. In places where ordinances have been passed and enforced on this subject, and sweeps licensed, fires caused by the burning out of chimneys or from defective flues have been of rare occurrence. Perhaps if in our respective fields we were to aid in having ordinances touching this matter passed we would prove ourselves public benefactors and at the same time promote the interests of insurance companies.

CORRESPONDENCE.

THE HARTFORD ORPHAN ASYLUM. — THE STATE CAPITOL.

HARTFORD, CONN.

The keen edge of distrust of Gothic architecture by the public hereabouts, except in its relation to ecclesiastical structures, has been somewhat dulled of late, not only by the building of the new State Capitol, but also by the completion of the Hartford Orphan Asylum, recently occupied, which offers a good example of Gothic work as applied to a secular building. It has been building for the past two years from designs and plans prepared by Mr. F. Kimball, of this city. The first impression produced is that of picturesqueness. This is attained by an artistic distribution of the masses and a close attention to constructive details, as well as by the treatment of the more important features of the composition. The entire plan as originally contemplated has not been carried out, sufficient accommodation for the present wants of the institution having been provided in those structures already finished.

The chief points of the design may be summarized briefly as follows: a main building thirty feet wide by one hundred and thirty-five in length and three stories high, its length broken and its sameness relieved by the projection of a central portion finished with twin gables above the main cornice line, a long wing on the right extending beyond the front and rear lines of the main building, an L running out from the rear of the main building to a distance of over fifty feet, and a square tower carried up at the intersection of the main building and the wing. This is finished above the lines of the surrounding roofs; the sky-line is further broken by a well-proportioned ventilating turret rising from the main roof above the central portion. The wing of the asylum displays no inconsiderable variety in the treatment, and is the first to attract the eye. The front is marked by an ornate gable, the lines of which are broken by a large chimney, and at the ground floor level a small bay window is thrown out. On the eastern façade of the wing is a square projection carried up the full height of the building, and the composition is further emphasized by a large, octagonal, wooden bay, having a bold projection from the main line of the wing and carried up through the several stories and finished with pointed roof, surmounted by a finial of metal-work. The asylum has a frontage towards the south; and upon the north advantage was taken of the natural slope of the ground to secure in the L a serviceable basement. The building depends for its color effects upon the contrasts of the several materials used in construction; the body of the work is of brick laid in red mortar, with a finish of brown stone and Ohio-stone, the latter being plentifully used about the principal entrances for door jambs, etc., as well as for copings and finials elsewhere throughout the building; white brick are seen in pattern-work upon the tower and also in some half-timber work about the triple gablets which form a conspicuous feature on the rear of the main building. The moulded brick, so popular with architects here, were first introduced to any great extent upon the asylum, and, together with brick for diaper work, enter largely into the design, serving important ends in beaded window-jambs, label moulds, cornice work, and string courses. With few exceptions the windows are pointed and evince study in their grouping and distribution, the large ones having mullions and transoms, while the tympana are filled with brick in various patterns. The dormer windows are of wood and vary in design; and English ridge tile of peculiar design crown the main roofs as well as those of the dormers throughout, the roofs being covered with dark slate banded at the ridge with red. The windows in the L have square heads, the jambs being of Ohio stone; the L is divided into five bays by buttresses, and the north gable is broken by a large chimney, a well executed piece of ornamental brickwork, a large shield panel giving additional effect to the work.

In the building, wide halls and corridors of generous widths give an air of hospitality, and the finish throughout, though plain, is substantial and effective. The main corridor on the ground floor, reached through the entrance hall in the main building, has rooms opening from it on one side only, the south, the opposite side being largely occupied by bays with slight projection, completely filled with windows which flood the corridor with light. Separate entrances for boys and girls lead from the front of the building to the main corridor; eventually, separate staircases will be provided. The large wing on the east of the main building is in part occupied by the residence of the superintendent, connected on each floor with the asylum, and contains also the two nurseries, one for day the other for night, the former apartment having a fine sun exposure afforded by the immense wooden bay alluded to. The staircase in the tower gives access to the first floor. Upon the first floor are found a school-room, dormitories, assistant-matron's room, convenient bath-room, clothes-rooms, etc. The second floor contains additional dormitories, linen and other rooms, and in a remote part of the wing a hospital; a lift in connection with the hospital runs from the basement to the second floor. The ground floor of the L contains the dining-hall, a characteristic feature of the interior of the asylum. This hall is 32 × 50 feet, with open truss roof; the trusses are of solid oak and are supported by massive corbels of Ohio-stone built into the walls, the lines of the trusses marking the bays, which are each pierced by triple windows filled with leaded sash. Large windows with stone mullions and transoms pierce the north wall, and between them, projecting boldly, is a massive, hooded chimney-piece of Ohio-stone. It will be enriched by carefully executed carving and will bear upon its face a brass tablet with the names of the founders of the dining-hall. The dining-room when completed will have a high wainscot of oak upon its several sides. The kitchen, laundry, scullery, etc., are beneath the dining-hall. Several large basement rooms serve the purposes of play rooms, and have cemented floors, convenient lavatories, and proper means of ingress and egress. The building is heated throughout by steam, the apparatus for which is beneath the kitchen. Care also has been bestowed upon the all-important subject of ventilation. Some attention has been paid to the laying out of the grounds about the building, and altogether the asylum stands out prominently among the newer buildings in Hartford.

Work upon the State Capitol has grown apace of late; the marble-work above the cone of the dome has been completed, as well as the lofty pedestal for the reception of the crowning figure in bronze. The figure will have been put in place by the time this letter appears in print. The staging upon the dome will remain in its present position until next season, when it will be required for placing the several statues about the dome. These are twelve in number, and when the State has so generously given of her wealth to build this costly structure, what can be said in favor of the piece of Yankeeism which authorizes the erection of six fine statues interspersed with six duplicates?

CHETWOOD.

THE FAILURE OF CONCRETE FLOORS AT CAMBRIDGE, ENGLAND.

The failure of concrete floors in the New Comparative Anatomical Schools at Cambridge, which occurred in February last, forms the subject of a special report by the Museums and Lecture-Rooms Syndicate to the Senate of Cambridge University, in which all the circumstances and subsequent correspondence are set forth in detail. Although the building itself was a comparatively small one, the correspondence is instructive as showing the incapacity of concrete to resist tensile strains, although it behaves admirably under compression. It is explained that the school buildings were designed by Mr. W. M. Fawcett, and were erected under his superintendence in two contracts by Messrs. Bell. When nearly completed on February 18th last, a slab of concrete forming the northernmost compartment of the roof gave way and fell to the ground, carrying the floors with it and three men at work on it. The syndicate on the following day instructed Messrs. Arthur W. Blomfield, M. A., and Thomas M. Rickman to examine and test the soundness and stability of the concrete floors throughout the building. In their report they state that

the structure was three stories in height, and about forty feet from the ground to parapet, and having a basement under part of building. The external walls, which varied from two and one half bricks to two bricks in thickness, were of ample strength. The floors and roof throughout were constructed of concrete of an even thickness of six inches, and excepting the roof perfectly level. The passages, landings, and roof were finished with cement paving, making a total thickness of seven inches. The floors were carried on rolled iron joists of the following weights and sizes: 18 ft., bearing 9½ in. deep, 25 lb. per foot run; 20 ft., bearing 10 in. deep, 33 lb. per foot run; 24 ft., bearing 12 in. deep, 43 lb. per foot run. The concrete floor was carried down from the top of the girder to the bottom flange by a filling-in finished with a slope, and at the top of each girder was a joint between the several slabs of concrete. This concrete was filled in over boarding, which formed a level centre for it, and which was originally set with a camber of three fourths of an inch, which was brought down to a level line by the weight of concrete before it set. The concrete was made with six parts of clean-washed shingle passed through a one-inch gauge, and one part of clean washed sand, and one part of the best Portland cement, with sufficient water thoroughly to set in one hard mass, and was fully up to this standard.

The accident seemed to have been caused by jarring in lifting a coping-stone, and involved the fall of a whole compartment of concrete, 18 feet by 11 feet, and the destruction of each of the floors on which the masses fell. The report adds that the concrete in the floors was very hard, although it did not contain so much sand as might have been used. The roofing material was, however, decidedly inferior, and no floors could be expected to withstand the fall of four or five tons of material. A portion of one of the girders, 7½ feet long, was subsequently tested by Mr. Kirkaldy, of Southwark, and found to be more brittle than could be wished for. It bore a load of 19½ tons without deflection, but broke under 35 tons, and proved to be crystalline instead of fibrous in texture. Messrs. Blomfield and Rickman therefore considered that the joists were not of sufficient strength for the purpose, and that the floors were so designed that any use to which they might be put trenched in many instances seriously on the working margin left in the calculations. Mr. Fawcett demurred to some of the conclusions in their last report, and to the proposed strengthening of the girders, and was permitted to test, with Mr. Mallett, two of the existing floors. They bore, the one a strain equivalent to 2 cwt. per superficial foot, with ¼ inch temporary deflection, and the other nearly 3 cwt. with ½ inch deflection. Mr. Baldwin Latham, C. E., was consulted by Mr. Fawcett, and pronounced the cause of failure and settlement in the concrete floors to be due to inherent defects in the material when applied in a large building liable to settlement from compression of the foundation, or from settlement in the walls. Concrete, he remarks, is often liable to fall from a simple jar, owing to the drying of the outer faces before the interior has set from crystallization. As the material will resist a very great compressive strain, but cannot withstand a tensile strain, it ought not to be used in large slabs. The girders in this particular building were insufficient, and should be strengthened throughout the building. Plans were then prepared by Mr. Fawcett, in consultation with Mr. Latham, providing for the reconstruction of the faulty compartments of roofs and floors, and for the strengthening of the rest by additional girders and columns, and were approved by Messrs. Blomfield and Rickman. The syndicate, however, were not altogether satisfied with the new plans, and it was eventually decided, on the advice of Mr. Latham, to remove the whole of the concrete roof and replace it by one of wood, slated; to reconstruct certain bays of the floors, — these, as well as those which have fallen, to be of wood in place of concrete; and to strengthen the other floors with additional iron-work. These works were undertaken at once; but, owing to the sagging and cracking of some of the old floors during the work, Mr. Latham was again consulted, and it was determined to remove the whole of the concrete floors except that on the ground level, and replace them by wood. The question of the respective liabilities of Mr. Fawcett and the University for the cost of these works of reconstruction has been referred to the arbitration of Mr. Charles Barry, President of the R. I. B. A., who has taken evidence and inspected the building, but has not yet made his award. — *Building News.*

ELEVATED RAILWAYS.

PHILADELPHIA, PA.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Sir, — In a recent number of the *American Architect* you very justly pointed out that the experience of New York warned other cities that the erection of an elevated steam railway was equivalent to the destruction of the street on which it was placed.

A plan is now being determinedly brought forward to build a steam freight elevated railroad on Market Street, of this city, from the Delaware to Thirty-fifth Street. You will realize the extraordinary nature of this proposition when you consider that the city is now engaged in building, at the intersection of Market Street and Broad Street, an enormous pile of very ornate buildings for municipal purposes, to cost about $12,000,000, of which the marble work, chiefly for ornamental purposes, is actually under contract for five millions. The building is nearly square, with four full fronts, all very costly. The elevated railroad is to pass in such a way as to *entirely destroy the architectural effect of all the fronts but one.*

That is, the line of road passes up Market Street with a double track twenty-six feet wide, passes along one half the east front, passes the whole of the north front and one half the west front. It has been intended to make the approach to the buildings very imposing in each direction, and great expense has been already gone to for that purpose. Of all this, three fourths will be destroyed by the road, if built.

But this is not all. Many of the rooms in the new building have been intended for court rooms. It has been doubted whether the street noises would not greatly interfere with the transaction of court business, and whether it might not be necessary to keep the windows closed, even in hot weather. Now New York experience shows that ordinary street noises are as nothing compared with the noises of an elevated railroad. On Sixth Avenue it is said to be almost impossible to carry on conversation in the front rooms, and even very difficult in the back rooms.

The absurdity of this Market Street scheme is so great that it would seem impossible of success if it were not being urged on by the Pennsylvania Railroad, — a corporation accustomed to buy or force its way. The engineering of the scheme is being done for the railroad by a person to whom, more than any other, Philadelphia owes her defective drainage. CIVIS.

HOW THE FRENCH GOVERNMENT BUYS PICTURES.

A CORRESPONDENT writing from Paris says: A friend writes me, asking if there is not some mistake in the price given in the newspapers for Vibert's picture of the "Apotheose de Thiers," bought by the government. They are only acquainted with the prices given by the United States Government when it orders a work of art, and are surprised to learn that the French nation only pays eight thousand francs for the enormous canvas which already has a world-wide reputation through the reproductions in photography and engraving, and that has been painted by one of France's favorites, whose smallest canvases, that one could put in a pocket, are sure of bringing as much. No, my friend, there is no mistake in the printed figures. Eight thousand francs is all that was paid for that masterpiece, and the frame which encircled it probably cost more than half that sum; but "*it was bought by the Government,*" and we all understand here that that is to say, "We do not pay more for a painting than the cost of the material and the time of a common workman; but we hang the picture bought by us in the gallery of the Luxembourg — the gallery of modern paintings — amongst the great men of to-day, and you know that ten years after your death if your work is considered worthy, something more than the fashion of a season, your painting will be transferred to the Louvre, and placed beside the old and famous masters, and you become one of that defunct body." And you know the promise of fame is more to an artist than price, — artists, I mean, not simply painters, — and if the Luxembourg Palace would promise to hang all free gifts, every artist who could afford to work for fame only, and many who could not, would order a large canvas and commence a picture, and gossip in the studios would eternally be about So-and-so's picture for the Luxembourg. But it is not so easy, for every year there is a committee appointed "for the selection of works of art for the Government." This committee is formed of artists and deputies; the artists supposed to have the interest of their profession at heart, and the deputies to control the artists who are supposed to have favorites amongst the new comers. Before the pictures are selected, a sum of money is voted for purchasing, and, as a general rule, the paintings are chosen from amongst those which have received recompenses at the annual exhibition, for the annual purchase of paintings is made during the Salon. If a painter receives a medal, he makes a written request to the committee, asking them to purchase his picture, and it is generally understood his request will be granted; for by his written demand it is understood he accepts the governmental price for his work. Thus artists paint large pictures for the Salon, in the hope of receiving a prize. If they are fortunate, they receive a medal, and then are also able to dispose of the huge canvas to the government. They can wish no more. If they miss the medal, then they are fortunate if they can sell to the state to be hung in some provincial gallery, for every large town has a public picture gallery, otherwise many of the huge efforts would have to be returned to the studios. — *Philadelphia Bulletin.*

MODERN ILLUSTRATED BOOKS.

A VERY few years ago pictures for books were engraved only on wood or on steel. Wood-cuts, with rare exceptions, were very bad. Steel engravings, technically good, failed in the artistic quality, and were, moreover, very expensive. "Books of beauty" and annuals were illustrated at enormous cost; and the price of a book no bigger than one of our shilling magazines was a guinea, and even then only paid its publisher when there was a large sale. An attempt to introduce better designs was made almost simultaneously by Seymour, Cruikshank, and Hablot Browne, the last better known as "Phiz." These artists etched their own works, and dispensed with the services of the engraver, who in other cases so often marred the best

design by clumsy or conventional execution. At the present day book illustration is in a transitional state. First, we have photography, with some hundreds of processes by which the artistic drawing may be transferred to the pages of a printed book with as little interference as possible from the engraver. Next, we have pure etching, which labors under the disadvantage of requiring separate pages and a different quality of paper from the letterpress. Wood-cutting has been brought to a point of perfection it has never attained before. Some of the American engravers are far ahead of any on this side of the Atlantic, and only want artists worthy of them to make a revival of the art of Bewick possible. We have not at the present time in England a single wood-engraver of the first rank, except for landscapes; but one or two of the French cutters are able to imitate steel-engraving on blocks with a success worthy of a better art. Lithography by itself is not common now, though Mr. Pooley in one of the books before us has used it with considerable advantage. Chromatic printing must be considered, on the whole, the coming art. Yet color is sparingly used in illustrated books, for the obvious reason that it can only be made to pay its expenses where the sale is very large, while it is impossible to print a great number of impressions of a colored picture without serious deterioration. Chromo-lithography led the way, some twenty years ago or more, with imitations of water-color drawings, so good as to give rise to the best hopes of art of this kind. Almost immediately, however, for the reasons we have given, they fell off, and few things more deplorably bad are to be seen than the faded, crude, ragged prints from Rowbotham or Harding which hang in every lodging-house. The demand for Christmas cards and valentines of a gorgeous kind brought in a new style of color-printing. Metal plates were successfully tried instead of, or in combination with, stone. The fact was recognized by several of the publishing houses that, to be cheap, good, and suitable for extensive circulation, delicate shading and half tints must be avoided, and designs employed which resemble rather a combination of the style of playing-cards and stained-glass windows. — *Saturday Review.*

NOTES AND CLIPPINGS.

We wish to draw attention to the publishers' advertisement on page vi. of the advertising pages, where it is stated that the numbers of this journal for November and December, 1878, will be given, gratis, to new subscribers who pay their subscription for the ensuing year before December 15, 1878.

The Cincinnati Chapter, A. I. A. — At a recent meeting of the Cincinnati Chapter, A. I. A., the annual election of officers for the ensuing year resulted in the following choice: President, James W. McLaughlin; Vice-President, E. Anderson; Secretary, Charles Crapsey; Treasurer, George W. Rapp.

The American Society of Civil Engineers. — At the recent annual meeting of the American Society of Civil Engineers the following persons were elected officers of the American Society of Civil Engineers for the year beginning November 6, 1878. President, W. Milnor Roberts; Vice-Presidents, Albert Fink, James B. Francis; Secretary, John Bogart; Treasurer, J. J. R. Croes; Directors, George S. Greene, William H. Paine, C. Vanderveort Smith, Thomas C. Clarke, Theodore G. Ellis.

Accurate Tunnelling. — An exceedingly difficult piece of underground engineering, and one which furnishes an admirable illustration of the accuracy of calculation based on scientific principles, has just been completed in Pennsylvania at the Hampton mine of the Delaware, Lackawanna, and Western Railroad Company. The Scranton *Republican* says: "The mine has been idle for improvements for some time, and the work under notice is the construction of a tunnel in the rock vein, making one slope serve the purpose for which two slopes and a 'dip' were formerly employed, effecting a considerable saving in men, mules, and machinery, and shortening the distance from the scene of the mining operations to the foot of the shaft by at least 2,000 feet. The survey was begun six months ago by Mr. Joseph P. Phillips, Mine Surveyor, under directions of Mr. Snyder, the company's Chief Mining Engineer, and from the outset was attended with the greatest difficulty. Over seven eighths of a mile, principally through old tumble-down workings, had to be surveyed, and 85 sights, at as many different angles, taken before reaching the point opposite the shaft from which operations for the tunnel should be commenced. The most difficult feature was to strike the exact starting-point, so that the tunnel, when completed, would be found mathematically correct on grade and point. A variation of a few feet up, down, right, or left would entail additional cost and labor in going over the task to secure uniformity, so that it is not to be wondered at that those responsible for the work regarded it with some anxiety until the workmen met in the middle of the tunnel, and proved the problem to be correct. At least a quarter of a mile of the survey was made through old workings where the roof had fallen in, and in some places the space was no more than two feet high, so that Mr. Phillips and his assistants were compelled to crawl through it. The survey was plotted on a scale of 100 feet to the inch, and the result on Saturday last, when the men who had been tunnelling in opposite directions cleared away the last barrier, and met face to face, was of the most satisfactory character. Every line came out just as it had been computed, and the work was complimented on all sides."

The Oldest Specimens of Iron. — The sickles found by Belzoni under the pedestal of the Sphinx, at Karnac, near Thebes, the blades which Wyse found embedded in the wall of the Great Pyramid, and the piece of a saw which Layard dug up at Nimroud are the oldest known pieces of wrought iron extant. They are kept in the British Museum.

Convict Labor. — A convention of stone-cutters of the United States and Canada was held in New York on Saturday, November 2d, at which resolutions were adopted denouncing the present system of contract convict labor as tending to bring honest labor down to the level of convict labor besides being ruinous to the interests of workingmen, and requesting all workingmen to unite and defeat any person who favors convict labor and demand from all persons who may request their votes, that they will oppose convict labor.

The Decay of Italian Art. — The inferiority of Italian paintings and sculptures, more particularly the inferiority of the latter, which was noticed at the Centennial Exhibition, was so apparent in the Italian contribution to the French Exhibition which has just closed that it has been thought necessary, in the interests of the future development of art in Italy, to make an inquiry into the manner of conducting the various schools of art and the methods there practised. Accordingly, the Minister of Public Instruction has directed the Commendatore Salazaro, the director of the Pinakotheca at Naples, to make a tour of inspection among the schools, "with a view of discovering to what causes must be attributed the present decay of art in Italy, rendered more obvious than ever by the Italian exhibition of works of art at Paris."

Plumbing Hints. — It appears from the *Plumber* that many people are ignorant of the great weight of set wash-trays of slate, especially when full of water and wet clothes, and provide very inadequate supports for them; that the sweating of a water-pipe can be prevented by covering it with a non-absorbent material, such as newspaper; that a good way to prevent pipes leaking at the joints is to grease the gasket and surface of the pipes with tallow before screwing them home; that a crack in an iron pump may be caulked with iron filings and sal-ammoniac, so as to form a rust joint; that a water back which is too large for the boiler attached, and consequently provides hot water in excess of the demand, will generate steam which will drive the cold water before it, so that when a faucet is opened steam will escape at that point to the alarm of the inmates.

Roman Antiquities at Strasburg. — The process of levelling the ground for a central railway terminus at Strasburg has led to the discovery of very many stone coffins, evidently dating from the Roman period, — a discovery which confirms the belief long entertained that this place was the site of a Roman burial-ground. Canon Straub, the president of the local historical society, who takes a great interest in all such matters, has obtained from the military authorities the assistance of several pioneers, and is making much deeper excavations at the new Central Station, in the hope of laying bare the whole plan of the Roman cemetery, and of discovering some objects of special interest to antiquaries.

French Miners. — The men live in *chorons*, — that is to say, villages constructed by the company, the houses being let to the men at a nominal price. Thus a miner has a capital house for $1 a month. There is a good deal of difficulty in gaining information in the *chorons* in consequence of the patois spoken by the inhabitants, their volubility, and the technical terms they employ. It appears that the miners are worked on a system of marchandage, which signifies that several miners make a tender for a vein, engaging with the company to extract the coal at so much the square yard, according to the difficulties of the task. The miners have to bring the coal to the opening of the pit, and it is drawn up by the company. To convey the coal to the spot in question the miners employ *herchears*, who are either old miners or boys. When the galleries were first opened the miners had an easy and lucrative business; they worked away with their picks, the *herchears* had no distance to carry the coal, and at the end of the day the returns were considerable. However, as the galleries lengthened, and as the depth of the mines increased, the work became less profitable. There was one gallery, for example, which was 1,400 metres long. The men had to keep this gallery in order; they naturally lost a good deal of time in getting in and out of it, and the *herchears* not only took a long time conveying the coal to the opening of the pit, but they often lost so much coal by the way that their cart loads were refused. Seven months ago the company did away with work on Sunday; two months ago Monday was suppressed, and no work was to be done on pay-day, which occurs twice a month. The consequence is that the miner has not only a much harder task than before, but he can work for only eighteen days in the month. — *Pall Mall Gazette.*

The Dangers of Picture Cleaning. — A Frenchman, while travelling on a railway with an Italian painter, confided to him the fact that he was the possessor of a veritable Pinturicchio, which had been handed down to him as an heirloom. The works of this old master, who was born in 1451 and died in 1513, are extremely rare. The Louvre possesses only one copy, a Virgin and child, and connoisseurs are ever doubtful of its being genuine. The picture of the French gentleman showed great signs of age, and was in want of being carefully restored. The Italian, having examined it, undertook the task. At the end of a month the picture was returned to its owner perfectly restored, and the Frenchman, who considered himself a great connoisseur, paid the Italian handsomely for his skill. A short time afterwards a friend, who really was a good judge of art, happened to pay a visit, and, struck with the picture, which was hung up in a handsome frame in the post of honor, exclaimed: "Why, you have had your Pinturicchio copied!" The picture was taken down, and the panel being turned around showed the unmistakable signs of age in its worm-eaten condition and the grain of the wood. The friend, astonished, but unconvinced, examined it more closely. "You have not remarked," said he, "that the panel is diminished in thickness." "Why, no." "It is your own panel," continued he, "but it is not your picture. The wood, being thick, has been cut in two with a hair saw, and thus two panels have been made, on one of which was the original. This has been stolen. On the other a clever copy has been made, which is the one you at present possess." The Italian was obliged to confess the fraud, and also that the original had been sold at an exorbitant price to an American, who had been on a visit to Paris to see the Exhibition. — *Exchange.*

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CONTENTS.

SUMMARY: —
Mr. Hunt's Decoration of the Albany Capitol. — The Report of the Supervising Architect. — Government Appropriations and Contracts. — Report of the New York Association for Improving the Condition of the Poor. — The Evils of Tenement Houses and their Improvement. — Plumbers and Inspectors 177
MODERN PLUMBING, X. 178
THE SANITARY "SCARE" 180
THE ILLUSTRATIONS: —
Church of St. Hilaire, Rouen. — Design for Furniture. — Dairy, Milton, Mass. — Skating Rink, Baltimore, Md. — Store on Hawley Street, Boston 180
THE NEW YORK LOAN EXHIBITION 181
MR. LAFARGE'S PICTURES 182
COMMUNICATIONS: —
A Curious Competition. The New York State Reformatory at Elmira 183
BOOK NOTICES: —
Handbook of Decorative Forms — Flaxman's Outlines . . . 183
NOTES AND CLIPPINGS 184

IT was a happy inspiration of the same growing desire to make the best of our artistic resources which put the decoration of Trinity Church, Boston, and St. Thomas's, New York, into the hands of Mr. LaFarge, that has called Mr. W. M. Hunt to paint the walls of the assembly-chamber in the New York State Capitol. The chamber is a large room with stone walls, and covered by two broad pointed vaults intersecting at right angles, also in stone. It is, we believe, the only important room in the country which is entirely walled and vaulted in stone. Above the windows in the north and south walls, in the tympana under the vaults, Mr. Hunt has placed two great compositions, covering spaces forty feet wide. He has taken advantage, in choosing his two principal subjects, of the coincidence of the revival of letters and the discovery of America. On the north wall he is painting the "Flight of Night" before the advance of modern civilization; the pendant on the south wall is "The Discoverer," Columbus sailing forth to discover a new world. These two leading compositions are already well advanced, and under somewhat novel conditions, the painting being done directly on the stone walls with no preparation of plaster.

The pictures are at once assimilated and contrasted by a fortunate treatment. In the first, we have a single female figure seated, semi-nude, on rolling clouds which bear her forward through the open sky, while three fleeing horses dash violently away before her, unrestrained by the hand of a groom who seizes one of them by the head. This is a conception which Mr. Hunt has long had in mind, and visitors to his studio, if they were not fortunate enough to see the original cartoon, destroyed in the Boston fire, will remember at least a photograph of it, and will recall the superb rush of these horses, which seem ready to run down the spectator. The second picture shows Columbus, as a single male figure standing in his vessel on the open sea, and attended by allegorical figures, which represent Hope, Faith, Science, and Fortune. A very ingenious device was used for adjusting the designs to their positions. The cartoons, once drawn, were photographed on glass slides and then thrown on the walls from a camera. By changing the position of the camera the image on the wall could be enlarged or diminished, and moved about, till the figures were duly adjusted both in scale and position; and then the outlines were traced at once directly upon the wall. Perhaps we shall find that Mr. La Farge's work and Mr. Hunt's will open a new chapter in our treatment of important buildings. The one which we have before tried to decorate with mural paintings — the Capitol at Washington — had always been tacitly accepted as the only one of its class; and its painting, it must be confessed, like its other artistic treasures, had not been widely enough or warmly enough admired to command imitation. Yet it is very desirable that such treatment should prevail. Perhaps nothing has in times past so much encouraged the development of a general feeling for art, as the habit of seeing and studying the work of the best painters and sculptors in commanding positions and on a generous scale; certainly nothing is a greater stimulus to artists themselves. A few years ago not many Americans would have dared ask an artist of reputation to paint a wall. To-day, we fancy, few artists would refuse.

WE received the text of the Supervising Architect's Report, to which we made some allusion last week, too late for notice at that time. It contains, as usual, an account of the condition and progress of the buildings now in hand; a statement of the appropriations made and amounts expended for each up to the date of the report (September 30, 1878), and of the unexpended balances; a schedule of existing contracts; and the customary list of all the buildings, finished and unfinished, which are under the care of the Treasury Department, with their cost to the present time. Twenty-eight buildings are actually in progress, for which, and for buildings not yet begun, the unexpended appropriations amount to about three million four hundred thousand dollars. The custom houses at Charleston and Port Huron, and post offices at Jersey City (remodelled), Parkersburg, and Trenton, are reported finished, as well as the alterations in the custom house at Pensacola. The post offices at Dover (Del.) and Covington, and Assay Office at Helena (Mont.), were to be finished before the winter, and, finally, the New York Post Office, which has been in hand since 1878, is reported entirely completed, the last appropriation of $10,000 having been so nicely apportioned that the balance sheet is clean, without a cent of surplus or deficit. The principal balances in hand are, in round numbers, for the post office at Austin (just begun), $116,000; for the Boston Post Office Extension, $333,000; the Cincinnati Custom House and Post Office, $300,000; the Chicago Custom House, $440,000; the Kansas City Post Office (not begun), $100,000; Memphis Custom House, $90,000; New York Barge Office (not begun), $210,000; Philadelphia Post Office, $200,000; the San Francisco Appraisers' Stores, $108,000; the St. Louis Custom House, $286,000; and the Bureau of Engraving and Printing at Washington (just begun), $290,000.

CONSIDERING the tendency of public buildings to outrun their estimates, to which we have been used, especially during the years of high prices, it is gratifying to find that several buildings have been finished at a cost well inside their appropriations and to be told that others are to be finished immediately with the same agreeable result, and that the executing of contracts at prices below the estimates has made it possible to use a fire-proof construction in several others where wood was intended. On the other hand, the old difficulty recurs of appropriations insufficient to carry on the buildings in progress without interruption. We are reminded that the backward condition of the Boston and Cincinnati post offices is due to stoppage last year for want of appropriations, and are told that the Cincinnati building must presently be stopped again for the same reason; that the custom houses at Fall River and Hartford have been dealt with in the same way; and that the Nashville custom house must go without a roof because the appropriation was not large enough to furnish it. To refuse money for new undertakings is an intelligible kind of economy, but to provide it in such driblets that work to which the Government is fully committed cannot be carried on without constant stoppages, is an economy which it is not easy to understand. Another kind of legislative economy was shown, after contracts had been made for the stone-work of the Memphis custom house, when Congress interfered to order that Tennessee marble should be used, making it necessary to interrupt the work and increase its estimates. A curious incident of the work in San Francisco is told. The cost of water furnished the Government was so enormous — "exhorbitant," the report not unnaturally calls it, — being eighteen hundred dollars per year for the supply of one building, and four thousand for water used during the construction of another, that the Government thought it wise to sink an artesian well. This it did at a cost of $775, and got water enough for all its needs. Recent experience, apparently, has led Mr. Hill to call the attention of the Secretary to the difficulty of maintaining an efficient superintendence over buildings at a distance from the central office, although he does not recommend any remedy.

THE thirty-fifth report of the New York Association for Improving the Condition of the Poor contains an earnest protest against the evils of tenement houses in cities and an appeal for their reform. The physical deterioration and contagion, the moral degradation, that are bred and spread among the people who swarm in these foul hives, are vaguely known, but not realized, by those who do not see them. The character of the evils

may be succinctly stated in a few sentences from a quoted portion of a report by Dr. Stephen Smith: "The poor themselves," he says, "have a very expressive term for the slow process of decay which they suffer, namely, 'tenant house rot.' The great majority are indeed undergoing a slow decomposition, a true cremacausis, as the chemists term it. . . . . Vice, crime, drunkenness, lust, disease, and death here hold sway, in spite of the most powerful moral and religious influences. . . . . Their intellects are so blunted, and their perceptions so perverted, by the noxious atmosphere which they breathe, and the all-pervading filth in which they live and move and have their being, that they are not susceptible to moral and religious influences." The prevalence of these evils in New York may be guessed from some of the statistics given in the report, which we may assume to be fairly correct. The crowding of population in some parts of the city is said to exceed anything recorded in any civilized country. It is computed that in a large district on the east side, including the fourth and sixth wards and parts of the eleventh and seventeenth, the population is not less than 192,000 to the square mile and in the fourth ward alone it reaches 290,000, while in the densest parts of London it is not more than 175,000 to the mile. Half a million persons are said to live in tenement houses, — say half the population, an astounding estimate which could hardly be paralleled in another city; one house is quoted which has contained no less than fifteen hundred inhabitants. In all of them a great part of the tenants live in rooms from which they never see sun or sky, and sleep in inner chambers that are absolutely shut away from the outer air. That most of the disease, crime, and violence of the city is nursed in them is known; in fact, hardly anything but disease and vice can live and grow there. Three quarters of the disease of the city is found in them, and the death-rate is double that of the richer quarters. Ninety per cent of the children born in them are said to die in childhood.

The trouble is hard to reach, not for want of legislation but for want of control. The laws which regulate tenement and lodging houses are strict enough and definite enough to restrain the worst of their evils, if they could be adequately enforced, but the number of these houses is so enormous as to defy efficient inspection. Their owners shield themselves behind irresponsible agents, or are out of sight entirely, or plead poverty, and in various ways evade the law. Many are men of wealth, and of political influence of a kind against which it is difficult to contend in New York. The Superintendent of Buildings, too, so the report complains, has been backward in coöperation with the health officers, and the Building Department has granted permits for buildings which violated the law. One necessary restriction, — that no building shall be built in the rear of another without leaving an open space between of from ten to twenty-five feet, according to the height of the buildings, — has been evaded with curious ingenuity, by building the rear building first, and then putting up the other in front of it. The case becomes more difficult because the pressure of hard times has driven people more and more into tenement houses, and these have been put up when all other building has been at a stand still, eight hundred of them having been built, all up and down the city, within the last eighteen months.

People are apt to take it for granted that the evils of tenement houses are incurable, and that the utmost that can be done is to provide some of a better class into which those may go who will. But the case is not so hopeless. Foreign cities have taken it in hand with success. Glasgow, Edinburgh, and Liverpool have opened streets, demolished and rebuilt, — at great cost, to be sure; yet there is clear evidence of improved health, and great reduction of crime in consequence. The tendency to revert to the old ills remains, but it can be resisted. But there are less heroic means by which much can be done. Tenement houses do not last forever, and it is quite practicable by good building laws to exclude from the new ones that are built the worst faults of the old. Experience abroad has shown for a good while that well-built and wholesomely arranged tenement houses can be made profitable; the example of Mr. Alfred T. White, of Brooklyn, whose Home Buildings we have before noticed (*Am. Archt.*, Jan. 19, 1878), shows what may be done with profit in this country. His experiment has succeeded so well, says our report, that he is now putting up a third building, which is to be an improvement on the others in its provision for the comfort and health of the occupants. And while the old tenement houses remain, which it will take a good many years to replace, much may still be done to modify their evils whenever the energy of those whose duty it is, or the pressure of public opinion, are sufficient to enforce a thorough system of inspection. Among the other remedies suggested is the Philadelphia system of separate small houses, but this demands either a different allotment of city lands from that which is used in New York, and imitated more or less closely in our other cities, or the banishment of the poor to the suburbs. Separate houses are unquestionably to be preferred for the comfort and well-being of the poor, more even than of the rich, but they are so much less economical than tenements, when land is very dear, that they cannot be expected to supplant them. As for living in the suburbs, it is wholesome, but the experience of Paris shows that to live at a great distance from his work is a real hardship to the poor man, and is felt to be so. Moreover, unless they are compelled to, the poor will not go away from the centres. They cling as persistently to the crowded regions of a town as does its business, and will rather live in wretched squalor in a compact quarter than in comparative comfort in a roomy suburb. There is very little hope of doing without tenement houses, and it remains a public duty to attend zealously to their improvement.

The most encouraging movement that we have seen noted for some time among mechanics' societies is the proposition of the plumbers and gas-fitters of Baltimore, that their city shall appoint an inspector of plumbing. Plumbers may be said, even more than architects, to be on probation nowadays, and a readiness to take the initiative in providing proper oversight and restrictions on their work is a far healthier symptom than we find in most of the efforts of mechanics' associations or trades-unions. Whether a city, which like Baltimore, contumaciously refuses to provide itself with a building-law, will rise to the occasion when plumbing is concerned, we cannot guess. Perhaps the proposal to make the inspectorship self-supporting, by making its payment depend on fees, may prepossess a municipality in its favor in these economic days; but an inspector is an officer who, more than others, needs to be resolute, independent, and impartial, and officers are not often made so by having to subsist on fees.

MODERN PLUMBING. X.

PLANNING THE ARRANGEMENT OF PLUMBING. — BOILERS AND WATER-FRONTS.

No part of house-planning is more important than the intelligent arrangement of the plumbing work with regard to the course of the various pipes, both for supply and waste, upon the proper regulation of which depends in great part the efficiency of all the apparatus. One of the most important points is to avoid long stretches of nearly horizontal pipe of any kind. Waste-pipes so placed are continually liable to siphon out the traps connecting with them, and they accumulate deposit rapidly; while supply-pipes sag and become air-bound, are difficult to drain when the water is shut off from the house, and when used for hot water lose heat rapidly on account of the slowness of the circulation in them.

It is also desirable to manage the pipes so that if any part of their course must be between the floor and the ceiling below, which is generally inevitable with waste-pipes, that course shall be parallel with and between the beams, not across either them, or any header, or trimmer-beam, or girder. It is evident that for a pipe running parallel with the beams their entire depth is available for securing the necessary pitch; where it crosses them, on the contrary, the pitch must be obtained by cutting more and more deeply into them, or boring through them; but as this last makes a little more trouble, plumbers generally prefer the saw, which they use in the most ruthless manner, cutting a tier of beams half through if it suits their purpose. The greatest watchfulness will not always prevent this, and even careful boring seriously weakens the beams, so that the part of prudence is to avoid crossing them altogether.

In general, the more compact the arrangement the better. A cluster of vertical pipes with the various appliances closely grouped around it in the different stories, gives the most economical and efficient disposition, and the more nearly this can be realized the better; but where deviations are necessary, as will generally be the case, they can be much more satisfactorily arranged if the course of all the pipes is kept clearly in mind. It will often happen that a wash-bowl or sink is better placed at some distance from the central stack of pipes than close by, if a girder or a trimmer-beam should intervene, and a door between two faucets on the same line of supply, forcing the pipe either to dip under it or to jump over it and descend on the other side, will affect the flow more injuriously than a long circuit at a uniform level.

To provide for all cases the architect should know not only where his waste-pipes will be most advantageously placed, considering all

the circumstances, but the number and position of the hot and cold supply, circulation and expansion pipes in every part of their course, the vent-pipes from the traps, the outlets from the safes, the tell-tale from the tank, and the ventilation pipes, if any, from closets or bath-rooms. With this knowledge it is a simple problem, but one too often neglected, to manage the disposition of closets and pantries, adding a cupboard in a convenient corner, building a permanent wardrobe in one room, or finishing another with a wainscot with some of the panels removable, so that in the completed house all the work is found to be accessible, yet inconspicuous; the shut-off cocks within easy reach, instead of being buried in coal-bins or hidden under floors; the supply-pipes secure against frost; and the colored ceilings safe from the danger which always attends the passage of water-pipes over them. The architect should have confidence enough in his knowledge to describe with precision in his specification the course of each pipe, indicating the levels in the different portions, so that the steady ascent and descent shall be everywhere maintained, describing minutely the deviations from the direct line which may be necessary in order to carry up the pipes in some convenient corner, and fixing the position of cocks and traps. Without such evidence of understanding of the subject as shall command the respect of the plumber, he is likely to find his plain intentions disregarded on one pretext or another: the pipes carried across the beams by the shortest cut, or ascending in the studding of the parlor walls, so that he is compelled to spoil the wall with a board casing; or perhaps the soil-pipe bulging out of the plastering in awkward places. Not even the best plumbers have much consideration for the woodwork and fresco which are to come after them, so long as their work is properly done from their point of view; so that without a clear and exact specification some such annoyances are to be expected. But with one who is incompetent as well as careless worse evils may follow: boilers collapsed for want of expansion pipes; traps omitted; tank overflows led into soil-pipes; closets supplied from the same cistern as the drinking water, or by a valve on the direct supply; and other annoying and dangerous faults, for which it is impossible to bring the plumber to account, because he can successfully plead that these ignorant and shiftless modes of work are those commonly followed, and that his specification was so unpractical or so indefinite that he had not clearly understood from it that anything out of the common course was expected of him.

Taking the simplest case of supply by a service pipe brought into the cellar from the street main, we have the choice of two modes of distributing the water over the house: either the pipe can be carried up through the house, throwing off branches on the way to all the cold-water cocks, and terminating at the highest faucet; or from the street supply a single pipe may ascend to the highest part of the house and empty into a tank, with a ball-cock to shut off the supply when full, and from this tank will descend the pipes, one or more in number, which, ramifying downward, supply the different faucets.

Where the water is obtained from a water-ram, or a force-pump drawing from a well or cistern, or by rain-water received directly from the roof, the second method, employing the tank in the attic with downward supply, is necessarily adopted. When it can be used, however, the first method is the cheapest, as it saves one pipe the height of the house, and the cost of the tank, besides certain pipes hereafter described; but it has certain disadvantages. Besides the obvious risk of having the house left without water in case the supply is shut off while repairs are making, the street pressure is often very heavy, reaching in some localities one hundred or even one hundred and fifty pounds per square inch, and the consequent strain upon pipes and fittings is very severe. Moreover, the head in the mains is sometimes variable, and this irregularity interferes with the working of valves and faucets.

With the tank system the pressure in all but the rising main is constant, and can never exceed the head due to the height of the tank above any given faucet, not over twenty-five pounds in the highest house; all the apparatus is therefore under the most favorable conditions for perfect working and long service. It should not be forgotten that in a pipe under heavy pressure the shock caused by suddenly shutting a faucet is equal to the blow of a hammer of weight equivalent to the pressure, say one hundred pounds, striking with a velocity equal to that of the stream of water at the moment when it is arrested; and this blow is applied just as much on every square inch of surface in the pipe as at the faucet. The weakest part of the pipe, usually at a bend or near some joint, soon yields a little, and the effect of the blows increasing as the resistance diminishes an opening is finally made. Even brass pipe, whose elasticity enables it to recover from repeated strains, often gives way at last.

But the worst deficiencies of the direct pressure system are to be found in the hot-water service. To understand this clearly requires a little consideration of the construction and working of the bath boiler and water-front.

The water-front is a closed box of cast-iron, which occupies one side or corner of the range, next to the fire. In the outer side are two brass couplings, one near the top and the other near the bottom, extending through to the outside of the range. Sometimes the place of the water-front is supplied by a copper tube, which starts from one coupling, and after traversing the fire two or three times ends at the other coupling; but these tubes are apt to boil the water in them with violence, and if the water is shut out of them they get red-hot and burn out, so that the iron front is to be preferred.

The boiler, which usually stands beside the range, is simply a cylinder of stout sheet copper, tinned inside, with a flat or slightly convex bottom, and in all but the poorest specimens a dome-shaped top. One or more galvanized iron bands are often fixed in the interior to strengthen it, and two, three, or four couplings are attached to the head, one in the side about eighteen inches from the bottom, and one either in the bottom or very low down in the side. The two lower couplings are connected by brass tubes with those of the water-front, and either on the lower tube or with a separate connection is a "sediment cock," for emptying the boiler and water-front. From one of the couplings in the head of the boiler a copper tube extends down to within six inches or so of the bottom, with open mouth, and near the top of this tube a small hole is bored. To this coupling is attached the pipe for cold-water supply. The cold water from the pipe descends through the tube, and accumulating naturally in the lower part of the boiler, passes through the lower coupling and the connecting brass pipe into the water-front of the range. Here it is heated, and becoming lighter as its temperature rises it ascends and passes through the upper coupling of the water-front, up the second pipe, which, to facilitate the movement, is laid with a gentle ascent toward the boiler, and entering through the side coupling takes its place in the upper portion of the boiler. This circulation constantly goes on between the water-front and boiler, and the water passing repeatedly through the range becomes warmed in proportion to the ratio which the heating surface of the water-front bears to the cooling capacity of the boiler. The difference in temperature between the upper and lower portions of the boiler and the upper and lower connecting pipes to the water-front may be plainly felt with the hand.

The other couplings in the head of the boiler simply communicate with the inside, and to them are attached the pipes which supply hot water to the house. Several couplings are used where the number of sinks and wash-bowls to be supplied is considerable, to obtain a freer flow than could be obtained from a single pipe compelled to supply several faucets; but one pipe is sufficient for a small house.

When a cock anywhere on this pipe is opened, the warm water issues under the same pressure as that of the cold water; for the whole system of pipes and boiler being constantly full of water, the pressure is the same throughout at the same level, the boiler being practically nothing but an enlargement of the supply-pipe, while the water-front with its tubes represents a loop through which portions of water are continually drawn from the boiler to the fire, heated and returned.

The drawing of hot water in any part of the house subtracts from that in the top of the boiler, causing an equivalent amount of fresh water to enter through the cold pipe, from which it is led without mixing with the warm upper stratum through the copper tube to the lower or cool part of the boiler, there to begin its journeys through the water-front, by which it is qualified in its turn to take its place in the warm, upper region. This is the principle of the modern hot-water supply in its simplest application.

Under this system it is evident that the only circulation is between the water-front and the boiler, and that in the hot supply-pipe, each branch of which terminates at some faucet, the water remains stagnant except when a cock is opened, and loses its heat by radiation, so that on drawing from any faucet this stagnant, lukewarm portion must first run off before obtaining the hot water from the boiler itself. To remedy this it is customary not to terminate the warm-water pipes anywhere, but to make them constantly ascend through perhaps devious courses from one faucet to another, until they reach the highest faucet, from which a pipe descends again and returns into the boiler, sometimes by entering the cold supply just above the coupling, sometimes through the lower tube to the water-front, or by a coupling of its own near the bottom of the boiler. In this way a secondary though extensive circulation is set up through the pipes themselves, hot water ascending on one side and descending on the other by virtue of the increase of its specific gravity on cooling; and at any point on the line water may be drawn of the same temperature as that in the upper part of the boiler, minus the comparatively small loss which it suffers in its rapid course from the boiler to the point at which it is drawn. To obtain this regular circulation in the hot pipes is essential to their satisfactory working; but it cannot always be managed unless the architect has kept well in mind the course of the pipes in arranging his wash-bowls and sinks.

So far the system is the same, whether the boiler is supplied under the street pressure by a pipe connected with the main, or from a tank. But certain circumstances may interfere with the working of the apparatus. It often happens that the water-front is too large for the work it has to do, or the copper tubes which serve as a substitute are too much heated by a brisk fire, and the circulation not being rapid enough to keep down the temperature the water begins to boil, and bubbles of steam run through the upper tube toward the boiler. The mass of water in the boiler being still below ebullition point, the steam is condensed on reaching it, and the sudden reduction of a pipeful of steam to a drop of water leaves a vacuum which is instantaneously filled with water. The next bubble of steam meets with the same fate, and the successive shocks caused by the sudden rush of water into the vacuum cause a snapping and rumbling in the pipes and boiler which often alarm housekeepers.

If the heat should be so great as to bring the water in the boiler

itself by degrees to 212°, the same phenomenon is in danger of being repeated on a larger scale. If all the faucets or other outlets are closed, the steam accumulates in the pipes and the top of the boiler, and acquiring a tension superior to the pressure of the cold water forces it back into the main. The water in the main serves as an elastic safety-valve, so that the steam pressure will never much exceed that of the water, so long as the connection between the boiler and the cold supply is unobstructed, and if the boiler is strong enough to resist the water pressure, there is little or no danger of its being burst outward by the steam; but there is a very serious risk that when the boiler is very hot and partly full of steam some one, by opening a hot-water faucet anywhere in the house, may allow a little steam to escape, and the tension being thereby reduced for an instant cold water presses in from the supply. The admixture of the smallest quantity of fresh water lowers the temperature of the contents of the boiler and condenses the steam with increasing rapidity as more cold water rushes in to fill the void so made. This process goes on with extreme rapidity, so that in a fraction of a second after the cock is opened the steam has vanished, and the condensation being much more rapid than the entrance of the fresh water, a vacuum is caused in the upper part of the boiler, and the atmospheric pressure thus suddenly brought upon it crushes the cylinder like a leaf. This "collapse," as the plumbers call it, is a very common occurrence, and with a boiler supplied from the street pressure there is no sure way of preventing it. One or more vacuum valves are often inserted in the head of the boiler, to open by the pressure of air from without; but these get so firmly pushed into their seats by the ordinary water pressure in the boiler that they are very apt to stick when most needed, and are then useless. Sometimes a stop-valve is put on the supply, intended to prevent the steam from pushing back the water; but this simply gives a closed boiler, sure to blow up if the steam pressure should exceed a certain limit. The only palliative, where the supply is direct from the main, is to be careful when there is a hot fire in the range to open the warm-water cocks continuously, and if steam should come out to shut off instantly all but a small opening, which may relieve the pressure so gradually as to prevent harm. Compression cocks, which open by a screw, are for this reason safest in use; but it is essential also that the heating surface should be properly proportioned, and the pipes between boiler and range, as well as the circulation pipes, should be large and smoothly graded, and the flow therefore easy and rapid, to obtain even a moderate degree of security.

Where the boiler is supplied from a tank the danger of collapse is almost entirely removed by the simple expedient of carrying up from the highest part of the hot-water system a one-half or three fourths inch pipe above the water-level of the tank, leaving the end open, so that any steam which may be generated escapes quietly, without ever accumulating tension enough to force water out of the boiler. Unless this pipe should be so long and tortuous as to get choked it is a sure protection. The end of the expansion pipe is turned over the tank, or, better, over the mouth of the standing waste, so that the foaming mixture of water and steam which sometimes comes up may run off without doing mischief. Of course, no such protecting pipe is possible under the pressure system.

The hot-water supply is sometimes arranged without a boiler, by employing two tanks, one for cold and the other for hot water, both placed at the same level in the attic. The supply-pipe descends from the cold tank to the water-front, and from the upper coupling of this a pipe ascends to the hot tank, from which a descending main branches to the different faucets. Both cisterns are open to the air, so vacuum or bursting pressure are there impossible; but an expansion pipe must be carried up from near the water-front to obtain complete security. This system is more expensive than that which employs the copper boiler, and the steam from the hot tank is disagreeable and injurious in the rooms, so that it is rapidly becoming obsolete.

Boilers supplied from the street pressure sometimes give way under the strain of the water alone, especially if they have been previously weakened by an incipient collapse, and where the head is considerable they must be of galvanized iron, riveted like a steam boiler.

Accidents also sometimes occur from attempting to empty the boiler by the sediment cock without opening a faucet above to admit air, or in occasional instances, where the supply from the street has been connected at the bottom of the boiler, by the retreat of the water in the mains, which, drawing with it the contents of the boiler, leaves a vacuum behind by which the cylinder is collapsed as effectually as by the sudden condensation of steam. The tank supply with the expansion pipe provides against this danger as well as the other.

THE SANITARY "SCARE."

Before going to Europe in June, I wrote a paper for *The Plumber and Sanitary Engineer* (published in the September number) referring to the "scare" outcry. I stated it as my purpose to "scare the plumber himself, and cause him to realize the fact that he is playing with fire whenever he undertakes the drainage of a house."

Further observation and reflection have not affected my opinion save to strengthen it, and I am satisfied that the most efficient service that any writer could render the plumbers would be to devote his energies unremittingly to emphasizing the evidence leading to this opinion, until they become convinced that the future prospects of their trade are really to be good or bad, according as they accept the present condition of public sentiment and accommodate themselves to it. The public is not a fool; and about some things it makes up its mind in a very resolute way, and is not to be driven from its position, especially when the arguments advanced for the purpose may be construed as being in the interest of those who advance them. The public is fast making up its mind that there is no safety in American house-plumbing; and American house-plumbing must become radically different from what it has been thus far, or the public will act upon its conviction, and get on with as little plumbing as possible.

It will not do to talk about good workmanship or bad workmanship as lying at the bottom of the difficulty, for the bottom is much broader and deeper than any question of workmanship. Of course, we want good workmanship so far as we have any at all. The question which is uppermost now in the minds of the more intelligent classes is whether we really need any plumbing work at all, beyond the merest necessaries of domestic economy. Numbers of persons are cutting off the pipes from their wash-basins, bath-tubs, etc., and are going back to the old wash-bowl and pitcher and the sponge-bath. Their reasons will be accepted as good, and their example will be followed by others; so that unless some strenuous and rational effort is made to restore their confidence in house-plumbing, the amount of work to be done during the next generation will be less than that which the present generation has demanded.

I have used the expression "the American system of plumbing" for the reason that plumbing, as we know it, is essentially and almost exclusively an American institution. In our desire to save labor so far as possible, to procure in our houses the luxury of abundant water without the task of carrying it in and out by hand, and to provide, even for those classes of society which are little given to luxuries, the untold convenience of a free tap of water at every point, we have carried the possibilities of the industry to its utmost limit; we have done this, too, in a country whose climate compels us to adopt precautions against frost which are unknown elsewhere; and we have done it absolutely without the knowledge necessary to ensure our doing it properly. The utmost profusion of plumbing has become so much a matter of course in the organization of our houses that until recently any man who seriously criticised the system was set down as an alarmist. Now that the alarmists are found to have right on their side, we are confronted by a dilemma, one of whose horns we must accept in spite of ourselves: we must either be content to see our people, under the influence of the instinct of self-preservation, throw their plumber's work out of doors and make up their minds to do more manual labor for the sake of better health and longer life, or we must frankly accept the fact that their fears have a valid foundation. We must not only accommodate our work to their demands, but we must show them that we have come to a realization of, and have learned how to avert, dangers which ten years ago neither they nor we knew or thought of.

The only other country which can be said to have any plumbing work at all is England, and the plumbing work of England is a very different affair from ours. It is rare to see in an English gentleman's house, in London or in the country, stationary wash-basins or stationary bath-tubs, fixed butler's sinks, or laundry trays, or taps for drawing water, except in the scullery or area, or some other place quite removed from the centre of habitation. Every bedroom is provided with a movable wash-stand with a movable apparatus; generally also with a tin sponge-bath, to which the water is brought by hand. Water-closets are in almost universal use, but they are generally in outside extensions, or at least against the outer wall; as a rule their communication with the outer air is much more free than their communication with the interior of the house. The whole somewhat rude system of plumbing is of a character and in a situation which, with our winter temperature, would be impossible. Of course, there are countless exceptions to this rule, and the people have suffered seriously from the fact that their workmanship is so often inferior to ours. Considering the amount of plumbing in average houses in England and here, they suffer from diseases originating in the drainage of the house far more than we do.

The question as to whether the American people will continue to be the liberal and extensive patrons of plumbers that they have been hitherto, or will go back to the systems of their ancestors, is one which is to be decided entirely by our ability to persuade them that we realize as well as they do the dangers which they fear, and that we have succeeded, as we certainly have, in devising efficient and reliable means for securing ourselves against them.

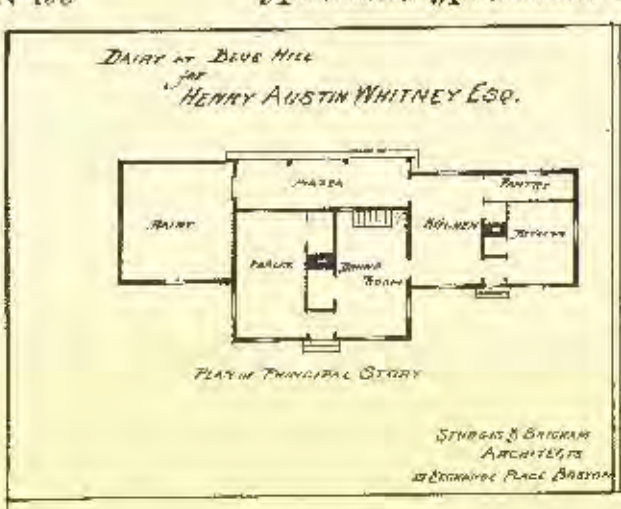
George E. Waring, Jr.

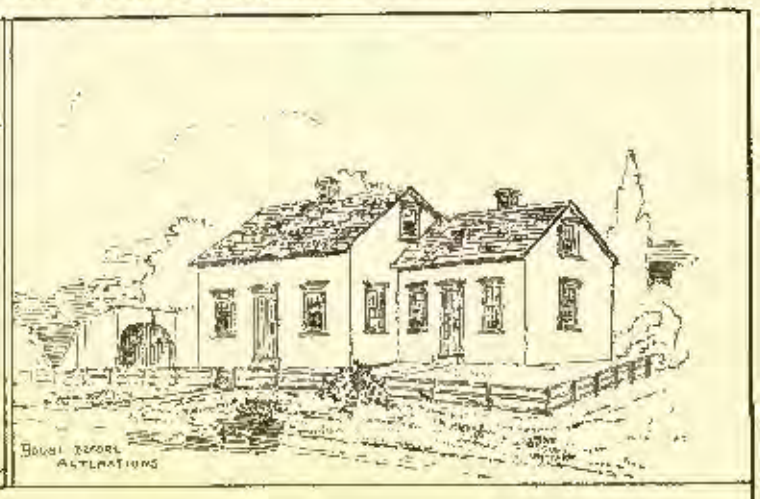
THE ILLUSTRATIONS.

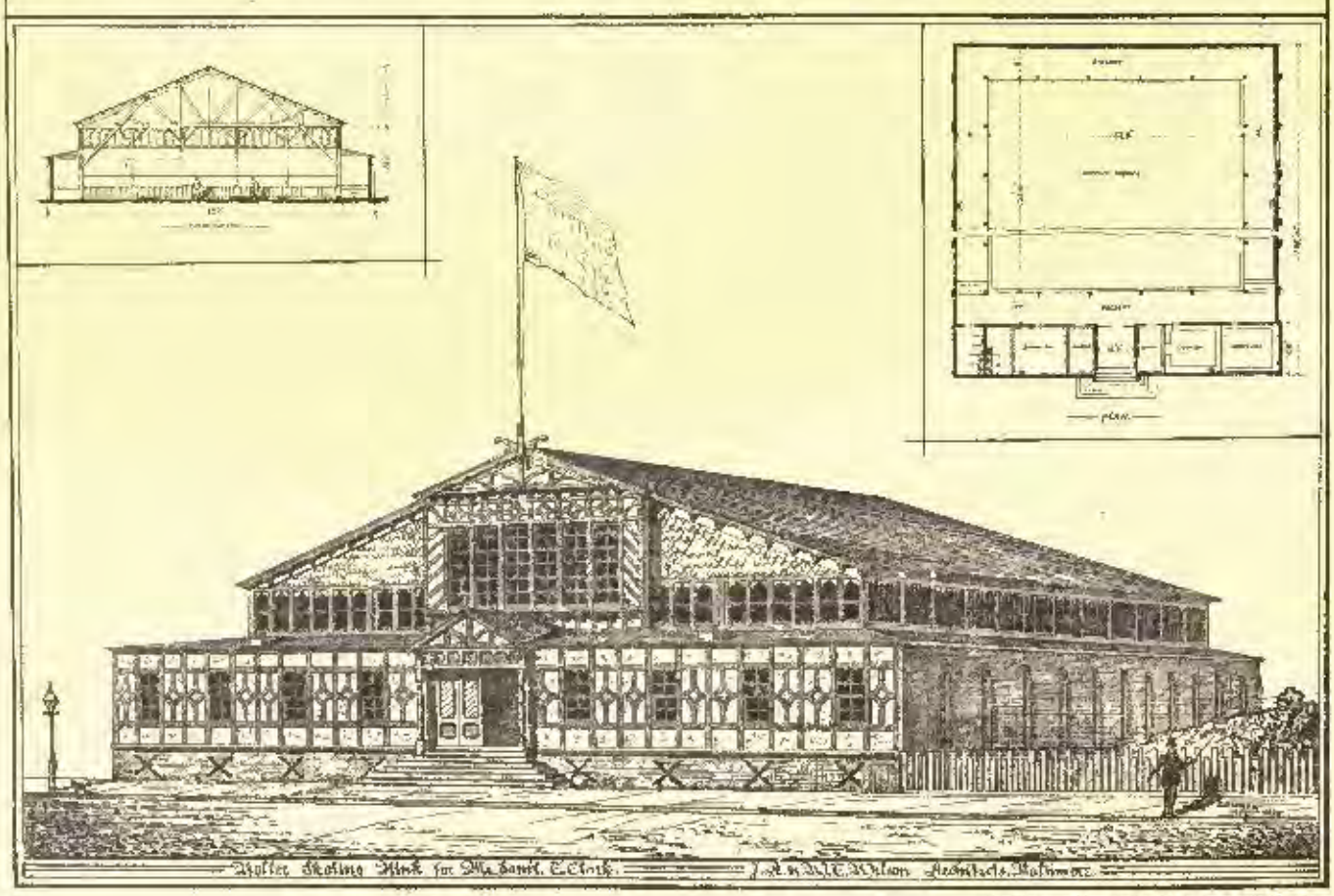
CHURCH OF ST. HILAIRE AT ROUEN, FRANCE. M. SAUVAGEOT, ARCHITECT.

We reproduce this week from *L'Encyclopédie d'Architecture* a perspective view of the Church of St. Hilaire, the plan and elevations of which we published in our issue for October 26.

FURNITURE DESIGNED BY MR. EDWARD DEWSON, BOSTON.







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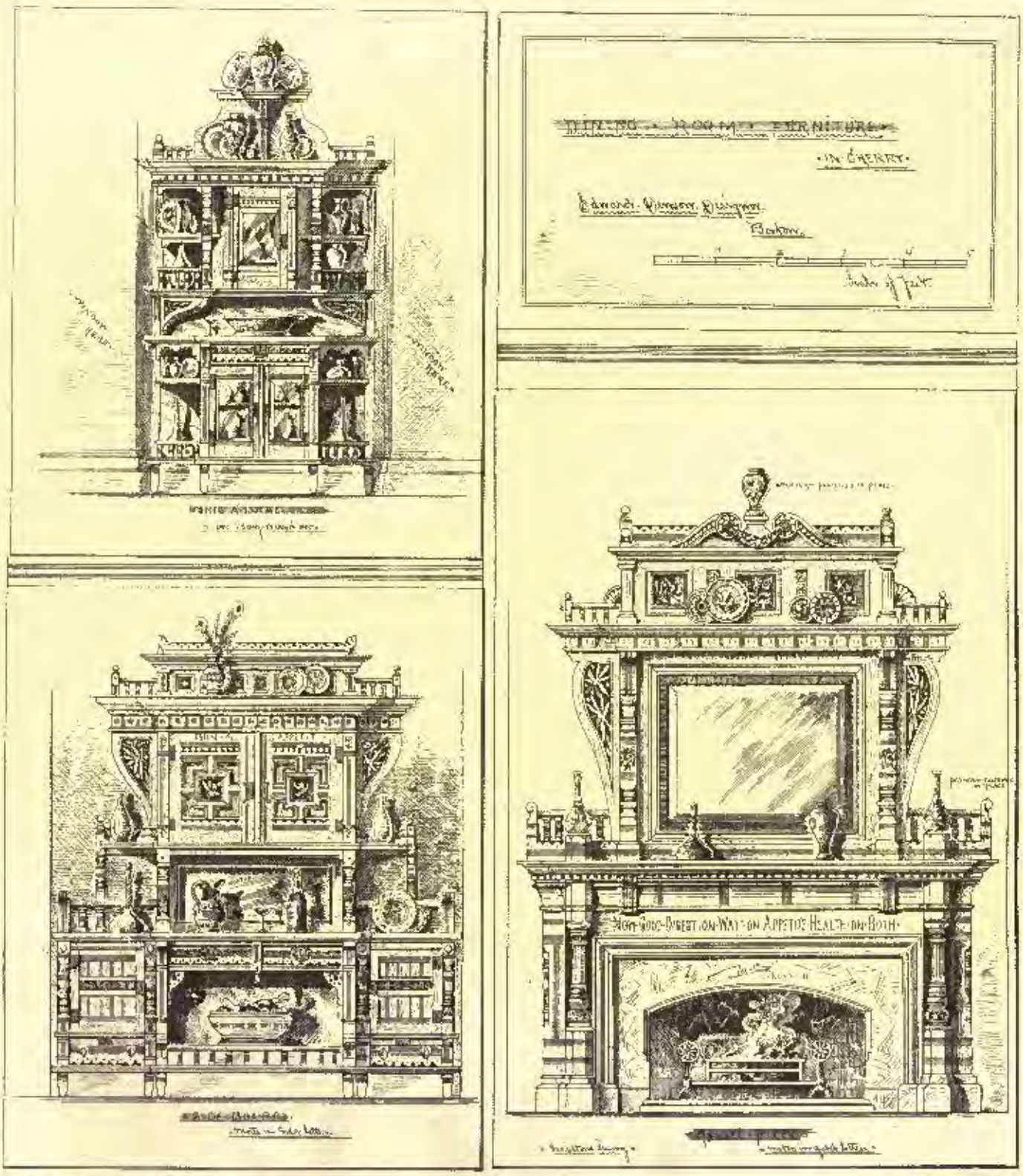
— CHURCH OF ST HILAIRE AT ROUEN —

— M. SAUVAGEOT ARCHT —



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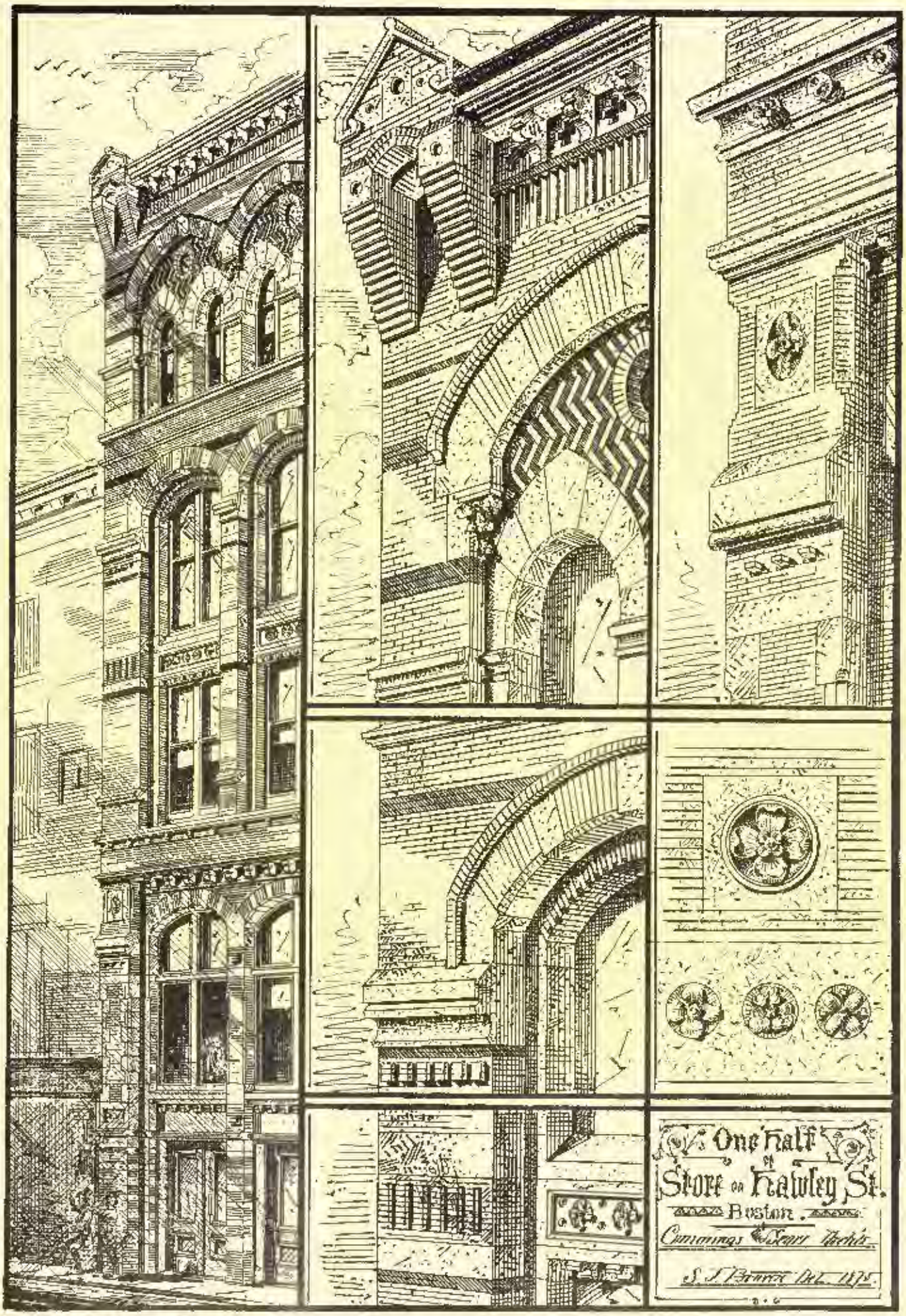

THE BRIGHTON PRINTING CO. 240 CONGRESS ST. BOSTON

ALTERATIONS MADE ON THE DAIRY OF MR. HENRY A. WHITNEY, MILTON, MASS., MESSRS. STURGIS AND BRIGHAM, ARCHITECTS, BOSTON.

SKATING RINK, BALTIMORE, MD. MESSRS. J. A. AND W. T. WILSON, ARCHITECTS, BALTIMORE.

This rink, to be used for roller-skating, is building for Mr. S. T. Clark.

STORE ON HAWLEY STREET, BOSTON, MASS. MESSRS CUMMINGS AND SEARS, ARCHITECTS, BOSTON.

This drawing is one of the series made by the Portfolio Club.

SECOND LOAN EXHIBITION IN AID OF THE NEW YORK SOCIETY OF DECORATIVE ART.

THE "Loan Exhibition" noticed in these columns somewhat less than a year ago, proved in many ways a most successful venture. A repetition was accordingly planned, and the exhibition now open at the Academy of Design is a more than worthy successor of the first. One marvels anew at the richness of the sources drawn upon, for all the rooms are full, and all articles previously shown have been rigorously excluded. The pictures are less showy and more excellent than last year, the pottery collections far richer and more valuable. The Oriental tapestries are fewer and less magnificent, but amateur work is not introduced among them. Bric-à-brac is less plenty, and the same may be said of silver, jewelry, furniture, and fans, while lace seems quite unrepresented. Upon the pictures and the pottery depends the interest of this year's show, and its value depends upon the excellent arrangement of the whole. The picturesque disarray and bewildering profusion of last year are replaced by systematic disposition and more careful cataloguing. What is lost in the brilliancy of the general *coup-d'œil* is many times refunded in the advantages of system and sequence.

The large South Room is filled with paintings, the East Room with European pottery and porcelain, the North with Oriental art products, and the West with bric-à-brac of every kind. The North-west Cabinet is devoted to specimens from the Decorative Art Society."

The greater number of the pictures are from foreign hands. Such American canvasses as there are, show in one or two cases a similarity of subject with their trans-atlantic neighbors that affords opportunity for interesting comparisons. Swain Gifford's *Lazy Day in Egypt*, and *The Merchants of El Lagouet crossing the Algerian Desert*, hang near enough together to catch the eye at almost the same moment. Preferring the latter, one is still dissatisfied with either, still convinced that the facts of African sun and shade and tint and atmosphere are not given. The question as to how they might be given, which always seems doubtful unless visible interpretation is forthcoming is set at rest if one turns to another wall where hangs Gérome's *Egyptian Convoy crossing the Desert*. The flatness and coldness of the other pictures is here replaced by a blinding luminousness which seems almost misty by excess of light, by sharp, dark shadows, by a pervading yellow tint, and by the general feeling — peculiarly characteristic of North African landscape — that the atmosphere is more palpable and important than the solid earth itself.

Three great canvasses of Bouguereau exhibit the insipidity, the want of life and force, the cold-cream complexion and sentimentality which should long ago have become distasteful to the American public. The *Spring-time* of his pupil Cot, — the picture which suddenly gave him a circle of admirers almost as wide as his master's — is also exhibited. It is as correct in drawing as Bouguereau's, with more of life, but equally trivial, and the flesh painting equally far from being true to nature or masterly in touch. A large landscape of Andreas Achenbach, who vibrates through a larger arc of varying excellence than is possible to many painters, shows him almost at his worst. The cloud-painting is what his countrymen would call *unerhört*. It is a pity, for there are many good paintings of his in the city.

Leloir's *The Slave* is a clever picture of a repulsive subject, so repulsive that it seems out of place in such a collection, would seem out of place in any lady's apartment. For there is not enough artistic beauty to overshadow the moral and physical unpleasantness, and the artist's cleverness does not rise to tragic power. Hector Leroux's *Vestal Discite* is exquisitely imagined and drawn, but the coloring is almost conventional in its reserve, and there is no attempt at texture, whether of water, sky, flesh, or garments.

Several pictures by different hands show the fashionable metallic style, glaring tints without shade, repose, or harmony, a travesty of natural color with no memory whatever of chiaroscuro. The best of them is decidedly the *Morning with the Dressmaker* of Alvarez. The worst unquestionably is G. Richter's *Veil Dance*, in which it is hard to discover a redeeming trait. It lacks even the clear outlines and careful touch one expects in this style of work. Commonplace in conception, faulty in drawing, and poor in technique, it is Eastern only in costume, for the types are without exception European and utterly vulgar. Such a picture would not be worth condemning were it not to notice the indulgence so often carelessly given to pictures whose counterparts in literature, for instance, would not be publicly approved. Madrazo, who has sometimes painted well, shows *At Breakfast*, which looks like a badly painted portrait of a very unladylike person.

Willems, Ziem, De Menville, Vibert, Meyer von Bremen, Knaus, and Salentin, show average work. More admirable are two fine cattle-pieces of Van Marcke and a landscape by Jules Dupré — not, perhaps, of his best. Alma Tadema, whose work is not very often seen in this country, is but poorly represented by a small scene from the 6th century. It is doubtless archæologically correct, but the composition, figures, and color are far inferior to his average — much more his cleverest — work. Jules Breton's *Brittany Penitent* is also below his average. In Boughton's *New Year's Day in New Amsterdam*, we see intensified the faults which have grown into mannerisms. It is well composed and grouped, doubtless, but the tints are pale, flat, and unnatural, laid on with no attempt at blending. There is no sign of modelling or relief.

Crowded out into the corridor, and "skied" as well, are two clever studies by Mr. Wm. Chase and a capital portrait by Detregger, worthy a most honorable place. It ought to be carefully studied, and it cannot be seen. On the line, but still in the bad light of the corridor, where, furthermore, it is impossible to get as far away as his touch demands, are two Makarts — poor for Makarts, truly, but very clever pictures and valuable as one sees here so little of his work. The *Ancient Egyptian Girl* is well posed and expressive, but harder in effect than is usual with Makart, and absolutely blurred in parts from pure haste or heedlessness. The *Turkey-seller of Cairo* is better painted, though the subject is less satisfactory, the face being veiled all but the eyes. The color is beautifully harmonious, the pose full of life and grace. Both pictures are but "pot-boilers" as compared with Makart's careful work, but even the pot-boilers of genius are interesting and, to a certain extent, valuable.

Among American pictures I shall also notice a good study of a *Boy's Head* by Mr. Hunt, and a pot-pourri of the same subject, by Mr. Chase. Eastman Johnson is at his best in the careful and characteristic *Coal Pickers*. Mr. R. C. Porter at his worst in the *Portrait of a girl reading*. Mr. LaFarge's *Study* of a woman in a green gown shows, as usual, greater mastery of drapery than can be claimed for any of his countrymen, but the flesh is poor. Mr. Whittredge's *Old Hunting Grounds* may fairly be taken as representative of the average American landscape, hard, careful, inartistic, unindividual, unideal, and yet not natural. Mr. Powell's *Venetian Boys* is impossible, and Mr. F. E. Church's *Mt. Desert* almost as unsatisfactory in another line.

If I have left to the last the finest picture in the room, it is because I fear to touch upon it, — doubt whether in doing it justice I shall not, to those who have not seen it, appear to exaggerate its merits. It is a life-size portrait by Fortuny, said, I know not how correctly, to be the only one he ever painted, and comes from the famous collection of Mr. Stebbins in Paris. It requires faith to take it for Fortuny's work, for his genius usually showed in a very different way. There is a tiny picture of his, also, in the exhibition, which gives a fair idea of the contrast. His figures, everyone knows, were usually small, his canvasses glowing with a brilliancy of varied and contrasted tints that his imitators can but travesty. His touch was rapid, dashing, uneven, and in his most carefully completed works one rarely sees a polished and finished surface. In this portrait — of a Spanish lady — the beauty of the result gets nothing from the accessories, for it was painted in 1865 when "The fashions" were not artistic. Black satin, crinoline, coral, and frizzed black hair do not sound and do not look picturesque; but one does not care for the things that usually go to make up a satisfactory modern portrait in view of the superb humanity, the perfect art of this picture. The pose, the drawing of head and hands, the expressiveness, as of nature seen face to face, above all, the flesh painting, are beyond praise. Most unlike Fortuny's usual brush is the ivory finish, the smoothness as of an actual, pure skin itself, and in noteworthy contrast the clever, rough impasto of the lace. In the over-reserve of color, in somewhat of Spanish stiffness, and in the general tone and character of the work it is unlike a Titian or any sunny Italian canvass, much like Velasquez, to whom it has been, not too presumptuously, compared. Is it too much to be believed of a contemporary painting that it might be hung in a gallery next either of these and not seem out of place?

In the "Antique Collection" in the West Room one notes many miniatures, the best, perhaps, one of an old lady, by Malbone (931), and one by Arland (942). Most beautiful and interesting, whether a genuine bit of Quentin Matsys's handiwork or not, is the little iron bas-relief No. 965. In furniture one marks little but a 14th century cabinet (1000), one in marqueterie (1296), and an arm-chair of the Louis Quatorze epoch (unnumbered). The silver is not remarkable. In the jewel-case the honors are borne off by some unrivalled contributions of Mr. Prime — a superb set (1123) of old Persian turquoises, engraved and gilded, which he dates from the 15th to the 17th century, and a necklace (1128) of sixteen ancient Egyptian scarabæi. Some intaglios of varying beauty form a necklace numbered 1113, and a mixed collection of antique stones are classed under No. 1116. No. 1085 covers a collection of "Danish and Swedish Silver Ornaments," some of which, wherever obtained, are more probably Russian in their origin. One pendant shows in ruder workmanship, the survival of an unmistakable Byzantine pattern.

No. 1133 is a chatelaine with a motley profusion of pendants, one of which is worthy of notice. It is a small flat figure which, if not a genuine old Irish or other Celtic bit, is a clever imitation. One notices also a jewel which gives a definite Pompeiian pedigree, and a necklace from India, marvellously pretty in its combination of tigers' claws with native goldsmiths' work. Among the watches, No. 1160 has good record work, and No. 1144 is a most beautiful bit of red enamel done by Boilly under Louis Seize. The various ivories deserve an examination, as do stray bits of bronze and brass. The bell (1114) confidently attributed to Benvenuto Cellini and purporting to come from Strawberry Hill is little like the work of his time; and its claim is somewhat audacious when there are scarce three undoubted works of his in Europe, — perhaps only one that is quite unchallenged. Strawberry Hill hardly guaranteed the genuineness of its labels, and it is equally hard to believe the bell Benvenuto's or to admire it on its own merits. Some fine French tapestries claim more notice than can here be given, especially as there is little space left for the two rooms full of pottery.

The majority of objects in the Oriental Room come from the well-known Butlingame, Harper, Andrews, Pomeray, and Williams collections. Their tasteful and orderly arrangement is due to Mr. Colman. Japanese art in its various branches is well represented, and one has the opportunity of comparing it with the work of Chinese artists, who have of late been neglected in favor of their island rivals. It is hard to distinguish among many works of so near and so high an average, but one must remark No. 614 as a splendid specimen of Japanese raised embroidery on a gold ground, some large Japanese pictures in water-color on silk and paper (681 636), exquisitely free and delicate, and a superb lacquer and painted screen (662). In ceramics are to be remarked a fine case of Rosedon specimens, an old Satsuma incense burner (754), and a curious Satsuma vase (753), and some magnificent Kishin pieces, whose turquoise and purple cannot be excelled for splendid contrast. Further, a Chinese enamelled porcelain tea-jar, most curious (771), a pair of Japanese enamelled vases (770), a vase with *soufflé* decoration (859), and a Satsuma vase with figures in relief (741). All of which are noticed not so much as being superior to their neighbors, but as samples and specimens. Mr. Hoe's collection of works in hard stone are most beautiful, especially the jades. Also noteworthy is a collection (739) of various small Japanese works in ivory, metal, etc.

The European pottery is most carefully arranged, and this year a tyro can gain a knowledge of sorts and styles. That any one sort is represented by especially good specimens it would be too much to say. In Sèvres we see a set in yellow and gold, the best one could have from the inartistic epoch of Charles X. A fine case of plates (437–447) well exhibits the varied styles of the factory. The Dresden pieces are numerous, but none of great value if we except some brown Böttcher ware shown by Mr. Prime, a saucer (272), and perhaps Nos. 131, 135, and 138. Some of the modern work is of the worst that is made. It is strange that the classification of Dresden porcelain in this country should be so arbitrary and should exclude all mention of Kändler, the finest artist without exception who ever modelled at Meissen. His work is lost to us in the general name of "King's period," assumed to extend from the "Augustus Rex period" to 1774.[1] His name, so familiar on his own ground, seems to be unknown to our collectors, who mark no difference between his exquisite rococo shapes, low relief, and delicate tints, and the very different styles which came before and after. Marcolini is the fashion. His painting is superb, truly, but his shapes far inferior, more commonplace, less characteristic, than Kändler's. The latter does not even get the credit with us of having originated his troops of tiny figurines.

A few good Vienna pieces call for mention, Nos. 270, 295, 296, etc., also a seventeenth century Rouen plate (550) and a Frankenthal vase (292).

There is much English ware, valuable to those who like fashionable curiosities independent of beauty. The best English work, such as the *Worcester Tea-Set* (393, 394), the *Worcester Stone Ware* (382, 383), and the *Derby Vases* (518, 519), *Salad Bowl* (522), and *Ewer* (263) are inferior to continental work, and the bulk of Spode, Bow, Chelsea, Lowestoft, and the rest is valuable for no artistic reason whatever. The smaller factories, whose short and unmarked existence was evidently due to the badness of their wares, have obtained celebrity to-day because they *were* short-lived and obscure. Every execrable bit of doubtful origin, which no one could wish to see duplicated, is more greedily seized upon than a pretty piece of Oriental work or of delicate Meissen modelling and color. The much discussed Lowestoft excites, by the specimens it shows, no feeling save the wish it had never existed; and it is hard to see what pleasure the most rabid collector can take in coarse figures like Nos. 330 or 320, or in printed ugliness like No. 328, or in No. 391, from Spode, or No 395 from Worcester, or such a monster as the Leeds cow, No. 415. And there is much in most English and American collections that is even worse than these.

It is pleasanter to look in the corridor at various fair specimens of *Grès-de-Flandre*, or at the cabinet from Tiffany's filled with examples of various modern factories. Especially good are the pieces from Colinot and Doulton, a graceful specimen from Nancy, and the ample Faïence of Longwy.

M. G. v. R.

[1] See *Metropolitan Museum Handbook* and labelling in present exhibition.

MR. LAFARGE'S PICTURES.[1]

We once had the pleasure of hearing an eminent landscape painter discourse upon a new method, which he had invented and perfected, of painting scenery "without reference to nature." This ingenious person could, according to his own account, enable any one, no matter how small his capacity so long as he had strength enough to wield a hog-tool, to produce, after a few weeks' instruction, irreproachable landscapes, each with its proper proportion of blue aerial perspective, its middle distance sunk in orthodox obscurity, and harmoniously distributed patches of Roman ochre and Vandyke brown in the foreground, which only needed a slight exercise of the imagination to suggest stones, sand, dry grass, or some other species of vegetation, so that the canvas at a proper distance presented a marketable imitation of nature.

Perhaps it may be possible for others to rediscover this invaluable secret. Indeed, some artists seem to have made considerable progress toward the acquisition of infallible art-recipes of their own. Why otherwise should each successive work of the celebrated X appear with a triangular expanse of Naples yellow in a particular corner, taking the form now of a wheat-field, now of a sandy slope, then of a dry patch in a grassy lawn, while a shady brook, cart-path, ditch, or what-not winds away, always in the same direction and about in the same colors, in the opposite angle? Or why should the periodical accounts in the newspapers of the life and services of the distinguished Y invariably portend the giving to the world of a large canvas covered with green paint, modified toward the top by a certain admixture of white or gray, and divided into irregular patches by streaks of brown, while in the middle blazes a spot of pinkish white, fashioned into a rude suggestion of a building of some kind?

Is it that nature presents herself to these artists always under the same aspect? Or can it be that, having once succeeded in representing her under a certain form to the admiration of the crowd, they devote themselves thenceforth to the mechanical repetition of the effects by which they have won applause?

Whatever may be the reason, the tendency of landscape painters to choose a succession of similar subjects, which they feel to be within easy reach of their powers, is very strong, and an ambition like Mr. LaFarge's, which disdains to repeat itself and loves to grapple with new difficulties, is as rare as it is noble.

This collection of pictures, gathered for sale out of the studies and sketches of twenty years, represents almost the whole range of the art, from the slight sketch of sky effect to the severe and conventional forms of decorative design.

To us, the most interesting part of the collection consists in the landscapes painted and finished on the spot, and we will devote a few words to them.

No one who has not tried to paint out of doors from nature can understand the immense difficulty of the work. We do not mean water-color sketching, in which a few happily chosen washes laid on with skill may convey with striking fidelity the superficial character of the scene; nor the scientific landscapes composed beforehand, with a framework of cobalt blue and gray for the upper part, a pronounced shadow across the middle, and a due allowance of "golden dirt" for the foreground, into which the intended view is forced, by dint of lopping and stretchings, to fit, leaving enough of the prominent features still visible to enable the caricature to be identified. Such art is not difficult of attainment. It is comparatively easy also to make studies of color out of doors, and afterwards, in the tempered light of the studio, work them up into a finished picture, which shall be better in tone than any of the sketches, and contain a certain amount of truth; but to block out, carry forward, and finish a picture under the perplexing out-door light, and in the face of nature herself, demands not only great technical knowledge and skill, but a degree of mental power for the intense and comprehensive grasp of the scene under a chosen aspect, and the persistent retention of this idea in the memory through the long processes of painting, in spite of the continual changing of the landscape itself, which those who have tried such a task can best appreciate.

It is a commonplace of the text-books to say that our whitest pigments are black in comparison with the sky, and that the colors of nature can be represented on canvas only in tones transposed to an octave very different from those for which they stand; but such transposition is not beyond ordinary skill; it is the mental process of analyzing and retaining the evanescent impression of a given scene, so as to hold that impression steadily through the minute and distracting details which crowd upon the eye in out-door work, which should command our admiration, and of this these paintings give abundant examples.

Our respect for the power of mind so displayed is, moreover, heightened by the variety of landscape effects with which we find it to sympathize; so that to say of LaFarge's pictures that one cannot tell which he enjoys most, smooth sea or rocky coast, summer or winter, sweet inland orchards or dark woods, is as true as it is his highest praise.

Nothing could be more free from artifice, from the vulgar *concetto*, than these paintings. Nowhere is the "brown tree" visible; the melancholy individual in black who should meditate in front of the principal high light is absent; no dog trots across the middle dis-

[1] The pictures which our contributor describes are those which were exhibited and sold in Boston last week. — Eds. American Architect.

tance, carrying the shadow through the picture. Everywhere we feel the unaffected simplicity, the sincerity, and, if we may so call it, the humbleness of nature.

It would hardly be possible to single out among the thirty small landscapes any of special superiority. If we have our favorites, we willingly attribute our choice to our own greater ignorance of certain kinds of scenery, or to some bias of association which we could not expect the artist to share.

It would, however, be wrong to pass over in silence the magnificent painting called the "Last Valley," in which is fully displayed that wonderful drawing of retreating perspective which, under a treatment even more subtle, formed perhaps the greatest glory of the great picture of "Paradise Meadows," now in Paris.

Of the flower studies no one who has ever heard of LaFarge will need a criticism. Let us pass on to the important figure subjects, which derive a special interest from their connection with the recent essays of the artist in decorative painting.

We must confess, after what we had heard of the picture, to a certain disappointment in the "St. Paul," which, however, after reflection we concluded to be due to the circumstances under which the painting was shown. The tall figure, standing vertically in the centre of the canvas, and cut almost in two by the sharp, white edge of the awning, whose rectangular shape occupied the upper half of the field, leaving the lower half dark, like an escutcheon divided in the middle, presented a still, archaic air in comparison with the easy attractiveness of some of the surrounding small pictures, which could hardly be otherwise than disagreeable in an easel painting. It was only by imagining it in its destined place, high above the eye, in the axis of a chapel, surrounded by the vertical and horizontal lines of the architecture, that it became manifest that the composition could hardly have been different. A posturing athlete would be revolting in such a frame, which could endure nothing short of almost perfect symmetry.

And, the picture once in place, this symmetry would, it was plain, add greatly to the majesty and impressiveness of the figure, while the violent contrasts of light and shade and line, which annoyed the eye in the small room, would be necessary to make it visible in the place for which it was intended.

Such was the well-understood principle of the noblest decorative painting, before the time of Raphael and Michael Angelo, and Mr. LaFarge deserves credit for having been faithful to the knowledge gained by profound study of his art, instead of catering to the preconceived notions of the multitude.

The same explanation applies to the "St. Mary," whose elongated proportions excite the surprise of spectators ignorant of the foreshortening effect which its intended position would have had upon it; and to the "St. John," the spiritual beauty of whose face, however, disarms the criticism of the most captious.

Let us finish our study, by way of *bonne bouche*, with the enjoyment of the delicious little picture of the "Centaur," painted for Mr. Richardson, and now the property of Mrs. Gurney. Here is no question of truth to nature, or of decorative proprieties; we are in presence of the soul of the artist, amusing itself with fancies of sweet color, delicate expression, and the beauty of harmonious line. The green grass flies from under the swift feet; we feel the cool breeze and smell the morning fragrance; we smile with the innocent child, and join in the affection which fills the movement of the ancient brute. It is poetry in color, the work of pure imagination, using, but transforming, the materials which it receives from the outward world.

C.

A CURIOUS COMPETITION.

The Special Committee of the City Council of Covington, Ky., invite plans from architects for building, in the city of Covington, a jail to cost not over $30,000.

No plan will be received after twenty days from date.

The successful plan will be paid for.

Plans to be sent to GEO. H. DAVIDSON, City Clerk, Covington, Ky.

OCTOBER, 18, 1878.

The above advertisement has appeared in all the Cincinnati papers, and speaks, in a measure, for itself. The advertisement has, however, such a vague, indefinite, and incomprehensible look upon it, that I instituted a sort of inquisition and discovered — nothing. No one seems to be able or willing to give any further information than the little that the notice contains. Cincinnati architects are not very busy now, and perhaps not a few will be found who rate their services so low as to be caught on any hook thrown out to them in the turbulent sea of competition, no matter how said hook may be baited.

C.

THE NEW YORK STATE REFORMATORY AT ELMIRA.

DETROIT, MICH., November 16, 1878.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

SIR, — In your issue of the 9th inst., among the list of prisons now in course of erection, the one at Elmira, N. Y., is spoken of as being in the "Romanesque style." Allow me, as one somewhat acquainted with the antecedents and progress of this building and its design, to correct such mistaken opinion of its features as such a general term as "Romanesque" might give, and to more accurately describe it as being in the pure Galvanized Iron Style, to all that the term implies. By all means, please, make this correction through the columns of the *American Architect*, that those interested may know in what Style $1,300,000 has been spent.

Respectfully yours,

CHAS. H. MARSH.

BOOK NOTICES.

GREEK ORNAMENTS.

WHILE amateurs are amusing themselves with decorating pottery it is well that they should know where to look for models; and since they are apt to take whatever they find ready to their hand, it is worth somebody's while to see that really good models are put into their way. This we take to be the purpose of the little hand-book of Greek Decorative Forms,[1] published by Tilton & Co., and edited by Professor Ware. It contains a dozen plates, chiefly of Greek vase-ornaments, selected from the works of Rochette and Owen Jones, and so selected as to give in a small compass a great variety of motives. There are also given a plate of vases copied from Meyer's admirable engravings of the Englefield Collection, and a sample vase, decorated and having a design by Flaxman. Finally three plates of Greek polychromic architecture are given on the authority of Hittorff, Boetticher, and others. The plates are neatly printed in colors, and with as much precision as is to be expected of block-printing. The least successful are the architectural plates, in which the colors of the inks used do not seem very happily toned, while the detail and even the modelling, being given in black ink, contrasts rather harshly with the colors, as is commonly the case in block-printing.

The cleverest thing in this little book is the ingenious compilation of the text, which, excepting the descriptions of the plates, is entirely composed of extracts from writers upon Greek art. The extracts are full of suggestion and are arranged in a fairly consistent essay of twenty 8vo pages. It would doubtless astonish Messrs. Ruskin, Taine, Semper, Owen Jones, Gladstone, Viter, and Henry Van Brunt, if they should see the book, to find themselves sitting quietly together in this little "symposium," and most of all, perhaps, to see how well they can be made to agree in it.

FLAXMAN'S OUTLINES.

A collection of twenty of Flaxman's outlines[2] by the same publisher are intended to serve the same end. They are taken from the illustrations to the Iliad and the Odyssey and are fairly reproduced, apparently from some kind of photographic relief plates. Flaxman's works have gone somewhat out of fashion of late, not because anything so good has taken their place, but as one of the results of the rebound from classicism to naturalism. Studied, as they were, principally from Greek vases, they are, what Wedgewood found them, the best modern designs attainable for the decoration of pottery, and since so many people are at work trying to make designs without designing, and to draw pottery pictures without drawing, it will be doing good service if these outlines can be made to teach some of them to know the value of a line, and to feel that a handful of flowers dropped on a plate do not make a composition.

PUBLICATIONS RECEIVED.

THE AMATEUR'S HANDBOOK of Practical Information for the Workshop and the Laboratory, containing clear and full directions for Bronzing, Lacquering, Polishing Metal, Staining and Polishing Wood, Soldering, Brazing, Working Steel, Tempering Tools, Case-hardening, Cutting and Working Glass, Varnishing, Silvering, Gilding, Preparing Skins, Waterproofing, Making Alloys, Fusible Metals, Cements, Glues, &c. Price ten cents. New York: The Industrial Publication Co. 1878.

THE THIRTY-FIFTH ANNUAL REPORT of the New York Association for Improving the Condition of the Poor, for the year 1878, with the List of Members and Contributors; organized, 1843; incorporated, 1848. New York: 1878.

LAWS AFFECTING TENEMENT AND LODGING HOUSES in the City of New York, and Brooklyn. Compiled for the use of Visitors of the Association for Improving the Condition of the Poor.

THE TEREDO NAVALIS and the Means of Preserving Wood from its Ravages, by Dr. E. H. Baumhauer, Commissioner to the Centennial Exhibition from Holland. Reprinted from the *Popular Science Monthly*.

ANNUAL REPORT OF THE SUPERVISING ARCHITECT to the Secretary of the Treasury for the year 1878. Government Printing Office, Washington, 1878.

THE BIBLIOGRAPHY OF RUSKIN: a Biographical List, arranged in Chronological Order, of the Published Writings in Prose and Verse of John Ruskin, M. A., from 1834 to the Present Time (October, 1878). Compiled by Mr. R. H. Shepherd, and printed for private circulation.

ROYAL INSTITUTE OF BRITISH ARCHITECTS, List of Members, and Appendix; Additions to the Library, and Abstract of Proceedings during the Session 1877–78. Published at Royal Institute of British Architects. London. 1878.

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[1] Tilton's Hand-Books of Decorative Forms. — No. 1, *Greek Ornaments*, illustrated with twelve plates printed in the original colors. Edited by William R. Ware, Professor of Architecture in the Massachusetts Institute of Technology. Boston: S. W. Tilton & Co.

[2] Flaxman's *Outlines*. First Series. Boston: S. W. Tilton & Co.

NOTES AND CLIPPINGS.

We wish to draw attention to the publishers' advertisement on page vi. of the advertising pages, where it is stated that the numbers of this journal for November and December, 1878, will be given, gratis, to new subscribers who pay their subscription for the coming year before December 15, 1878.

A Contumacious Owner. — J. B. Tallman, the owner of a proposed building at 37 W. Fifty-third Street, N. Y., has been arrested and taken before a police magistrate on a charge of violating the building law, in carrying up thin walls beyond the specified height. Civil proceedings and injunctions were of no avail, so the department was compelled to resort to the more severe criminal proceedings. To change a twelve foot wall to a sixteen foot one, Tallman carried up a four inch facing, but owing to some clerical flaw in the complaint Tallman was discharged and is to be arrested on a renewed complaint.

Accident. — On Saturday last the carpenter repair-shop of the Cleveland, Columbus, and Indianapolis Railroad at Cleveland was wrecked by the falling of the roof, causing serious injuries to four of the twenty men in the building. The details of the accident are not clearly given; but it appears that the shop was a brick building two hundred and fifty feet long, but no data as to the width of the building or thickness of the walls are given. The walls were twenty feet high, and carried the roof frame, from which were suspended two floors, which at the time of the accident were evidently overweighted with stacks of hard-wood lumber which were stored there.

Bridge over the Firth of Forth. — Mr. John Waddell, contractor for the foundations of the North British Railway bridge across the Forth, recently began operations with a large staff of workmen. Starting from abutments on the high ground overlooking the foreshores on either side of the Firth, the bridge is to be carried in the form of a light lattice girder structure upon cylindrical brick columns to the edge of the deep water. As far as this part of the work is concerned, it is not believed to present any feature of difficulty. But in the two great spans, each 1,600 feet long, which are to form the central portion of the structure, there has to be faced one of the most difficult engineering feats imaginable. Regarding this portion of the work, the Scotsman says that at the point on each side of the estuary where the bottom begins to shelve rapidly downward, there is to be placed an immense composite pier, consisting of four groups of iron columns — six-teen columns in all — firmly bedded on basements of masonry and securely braced together throughout their entire height. Over the tops of these piers will be carried immense chains, whose shoreward ends will be anchored to ponderous masses of masonry; and these, being continued over two similar piers, placed on the island of Inchgarvie in mid-channel, will afford, on the suspension principle, such assistance as is estimated to be required in supporting the spans, which, of course, will also rest at either end upon the framework of the piers. The height of the great 1,600 feet spans has been fixed at 150 feet, to reach which level the shoreward section will require, as in the case of the Tay bridge, to have a certain gradient, and when it is added that the piers will reach the height of from 500 to 600 feet, some idea may be formed of the imposing appearance which the completed structure will present.

Panics. — It is curious to note how these panics in public buildings seem to come in batches, like railway accidents and the like. Within a few days several similar panics have taken place in houses of worship. No less than two occurred in Jewish synagogues on the Day of Atonement — one at Posth and the other at Strelno in the province of Posen. In the former case it seems that there was a great crush, and some one being hurt cried out, "Fire!" This caused so much alarm, and such an increase of the pressure that the railing of the staircase leading to the gallery was broken down, and many of the women who were upon the stairs were forced over, falling one upon another. From forty to fifty were thrown down to the ground. It was a long time before the panic was allayed. Many women were carried in an unconscious state into neighboring houses. Six women received severe injuries, and a child had its jaw broken. At Strelno the panic was caused by a portion of the ceiling falling in. About thirty persons, chiefly women, were more or less seriously injured. One has since died, and it is feared several others will succumb to their injuries. — *Letter to the N. Y. Herald.*

Tests of Strength. — Before the recent royal marriage at Potsdam, in order to see whether the floors of the Hall of Shells would stand dancing, the authorities marched in as many soldiers as there were to be guests, and gave the order, "Dance!" The floors stood the test. A similarly ingenious experiment was tried some years ago by the people of a Swiss canton. A splendid suspension bridge had been thrown across a deep ravine, and to see if it was firm the authorities declared a holiday and collected everybody on the bridge. It stood, luckily.

Excavations at Rome. — The Roman excavations are proceeding rapidly. Since the beginning of those in the Valley of the Forum 80,000 cubic feet of earth have been carted away between the Temple of Antoninus and the Arch of Titus. The excavations of the Stadium of the Palatine, already almost finished, have led to the discovery of extensive works in marble.

Various Uses of Paper. — The *Western Paper Trade* says that among the articles manufactured of paper displayed at the recent Berlin Exhibition were window blinds, asphalt roofing, material for garden walks, window curtains, and a house made of pine, with not only roof, ceiling, cornice, and interior walls of paper, but all the furniture, blinds, curtains, chandeliers, carpeting, ornamented doors, numerous mantel and table ornaments, and finally a stove of asbestos paper, with a fire burning away cheerfully and not consuming the stove, as it evidently ought to do.

The Sewers at Brighton. — Brighton, in England, is a famous watering-place, and as such is very sensitive as to her reputation for good sewage disposal. The town is situated on a bluff on the coast, and is protected from the encroachment of the sea by a heavy wall sixty feet high. Formerly the sewage was mainly discharged through pipes into water from twenty-three to thirty-one feet deep at mean high tide, at distances from the shore of fifteen hundred to two thousand feet, and into a current of from two to three miles an hour. These outfalls were very efficient, and for ten years gave no trouble in maintenance; but though the sewage was delivered by the pipes, moment by moment, into a current, and almost always disposed of before it could reach the shore, the sensitive residents were dissatisfied because the sewage, from its less specific gravity than that of sea-water, rose to the surface and appeared in discolored patches, which were plainly visible from the shore, a third of a mile away, alarming the visitors when they knew what it was, and the effluvia near by was unpleasant. At times a southwest wind drove it to the shore, but so diluted as to be practically harmless. The opposition to this state of things grew to such proportions that the authorities finally built a sewer seven and one fourth miles long, largely through rock tunnelling, to discharge the sewage at Portobello, out of the neighborhood of the summer visitors. This outfall cost the town half a million dollars, and it cost the contractors much more. — *Providence Journal.*

The Porta Nigra at Treves. — Among the four important structures at Treves which are credited to the Romans; to wit, the Basilica of Constantine, the Baths, the Amphitheatre, and the Porta Nigra, the last is perhaps the most interesting, although a more modern structure than the others. It differs from the others in that it is built of immense blocks of dark stone dowelled together by iron bolts, while the others are built of Roman bricks. The date of its building is a matter of archæological controversy, but it is probable that it was built during the latter years of Roman supremacy. From 1047 until the early part of this century, when Napoleon I. began to restore it the gate was appropriated to the uses of religion, for its archway was walled up, and its upper stories were used as two distinct churches. At present, thanks to the care of Napoleon and the later efforts of the Prussian Government, it is nearly in its pristine condition.

Trees of the Genus Eucalyptus. — So much has been said of late regarding the uses and probable extended application of the products of the *Eucalypti*, that a few notes on the products contained in the Industrial Museum at Melbourne will exemplify the value of this great genus. Of all the species the blue gum (*E. globulus*) is certainly the best known, on account of its reputation, whether justly so or not is still unproved, of purifying malarious districts. Few trees, perhaps, have ever attracted so much attention as this species. Trees have been planted in almost every country where it could possibly succeed, and even in small private gardens the blue gum is very often to be found. As a timber tree it will no doubt prove valuable, on account of the colossal size to which it grows, and its extremely rapid growth, together with the great strength and durability of the timber, which in the colony is largely used for beams, joists, etc., in buildings, and for railway sleepers, piers, and bridges. Besides the uses of the wood, the resin exudes from the tree in very large quantities. Essential oil and other extracts have also been prepared from the foliage. The most colossal species is, perhaps, *Eucalyptus amygdalina*, which is known locally under various names as stringy bark, messmate, peppermint, etc. It is said to be not uncommonly found up to a height of 420 feet, and sometimes to attain a still greater height. The wood is hard and close-grained, well adapted for house-building, planking of ships, shingles, rails, and other purposes. This species contains more oil in its foliage than any of its congeners; 1,000 pounds of freshgathered leaves, with their small branchlets, yield by distillation 500 ounces of oil. It is rubefacient, disinfectant, and employed externally in rheumatic affections, and in perfumery, scenting soaps, etc. The spotted gum of Victoria (*Eucalyptus goniocalyx*) is a species often found of a very large size, but mostly of moderate dimensions. The wood is hard, straight, and even-grained, and is employed in the colony chiefly for joists, beams, rafters, and heavy framing work, as well as by coopers for staves. The bark is described as being usually deciduous, but sometimes persistent. The species produces resin in very large quantities, and from 100 pounds of fresh leaves 16 ounces of essential oil have been obtained. For illuminating purposes this oil is admirably adapted; it produces a brilliant white flame, superior in intensity and color to that from the best American kerosene, and its use in kerosene lamps does not cause any smoke or smell, and is free from danger. The other most useful species valued for their timbers are *Eucalyptus rostrata*, the red gum tree, a tall growing tree, very abundant along the river flats and open valleys, the wood of which is of a brownish red color, and is used alike for furniture, carpentry, agricultural implements, and ship and house building; *E. leucoxylon*, the iron bark tree, often growing to a great height, and producing, perhaps, the strongest timber of the whole of the eucalypts; and *E. obliqua*, the Victorian stringy bark tree, a gigantic tree, not unfrequently attaining a height of from 300 feet to 400 feet, with a very thick, rugged, and fibrous bark, hence its local name. The wood of this tree is not so strong and durable as most of the other species. It is straight, and even-grained, and is readily split into fencings, palings, shingles, etc.; nevertheless, it is very liable to warp and twist. The thick fibrous bark is used for thatching houses. — *Journal of the Society of Arts.*

Steam as a Reflector and Radiator of Light. — It is said that Herr L. Brandau, of Berlin, has been granted a patent for an invention which is to utilize the absorptive and emissive properties which steam is said to possess in a high degree, of one of which properties we have ample evidence in the flash of lightness which accompanies the sudden discharge of a cloud of steam on a dark and cloudy day. The apparatus which Herr Brandau proposes to use, and which he hopes will be useful in dulling the brilliancy of the electric light without absorbing too much of its light, is, essentially, a glass chamber with proper inlet and outlet tubes into which the steam is admitted, and which receives rays either directly from the illuminating source or indirectly from reflecting mirrors.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, DECEMBER 7, 1878.

CONTENTS.

SUMMARY: —
The Chicago Custom House Indictments. — The Fifteen per Cent Contracts. — Their Responsibility and their Abuses. — Major di Cesnola in Cyprus. — The Turks and Archæology. — Mr. Walsh's Superintendence. — Professor Norton and the Cathedral of Florence. — Mr. Whistler and Mr. Ruskin . 185
ARCHITECTS' RISKS 186
THE OPEN FIRE-PLACE. IV. 187
THE ILLUSTRATIONS: —
Cathedral at Cape Haytien, Hayti. — House at Newport, R. I. — House at Sneeden's Landing, N. Y. — The Bureau of Engraving and Printing at Washington. — Gymnasium at Concord, N. H. 189
LEGAL RESPONSIBILITIES OF ARCHITECTS. I. 190
CORRESPONDENCE: —
Letter from New York 190
THE LATE MR. COCKERELL 191
COMMUNICATION: —
The Ownership of Drawings 191
NOTES AND CLIPPINGS 192

WE should be glad to be excused from entering into the question of the Chicago quarrel, which seems to us neither stimulating nor edifying. It has every aspect of a political feud, and is only the latest phase of the overhauling undertaken last spring by Collector Smith. We gave at that time a pretty full summary of the charges made by the collector against the contractor for the stone-work and the Supervising Architect's office, as well as of the report of Assistant Secretary French of the Treasury Department, exonerating the Supervising Architect and his immediate subordinates. Having failed to make the desired impression in the Department, Mr. Smith has, it appears, brought his accusations before the courts. The result has been the indictment by the grand jury, as our readers have heard, of eight persons, Messrs. Mueller (the contractor for the stone-work of the Chicago Custom House), Mills (his clerk), Hill and Potter (the present Supervising Architect and his predecessor); Burling and Prussing (the late superintendents), Reed and Wheaton (foreman and inspector of stone work). The indictment, of which the text is given in the Chicago papers, charges these persons with having conspired at Chicago on the first of September, 1876, to defraud the Government of eight hundred and fifty thousand dollars, money paid to Mueller on account of his contract for stone, and of having, in pursuance of this conspiracy, committed many acts of specific fraud which are enumerated. The whole thing reads a good deal like a burlesque, especially when one comes to the final presentment of the jury, in which Messrs Mullett (the former Supervising Architect, under whom Mueller's contracts were awarded), Robinson (the Treasury Solicitor who then examined the contracts), Rankin and Montrose (the first superintendent and inspector of the building) are declared to be also guilty, whom, therefore, the jury would like to indict also, were they not bound by the statute of limitations, the discovery of their iniquities being made too late. It is not so strange after all this that some of the papers have got so much "mixed" over the matter, or have so far lent themselves to the pleasantry of it, as to declare soberly that the grand jury aspired to include ex-secretaries Bristow and Morrill in the same indictment, had not the statute of limitations again come in their way.

THE contracts did work badly, and gave an opportunity for the contractor, or his workmen, with or without a common understanding, to make the work extravagantly expensive. The checks provided — the appointment of government time-keepers — proved insufficient, in the case of the Chicago building at least, to control the work. The interest of all the workmen being enlisted (a rare conjuncture) in increasing the contractor's profits by delaying their work, he had nothing to do but to let things go their own way and take advantage of them, while he kept within his legal rights. If he was shrewd enough to so use his advantages as to get the better of the Government, he was, as Secretary French said in his report, entitled (legally) to this, and there was no help for it; as for the purity of his motives and the honor of his dealing, they are not within the jurisdiction of courts of law. The censor of the Department would seem to have been excited by the disastrous result of these contracts to make a headlong attack on whoever was concerned with them. It is quite likely that there was collusion, as Secretary French imagines, between the workmen and those who were immediately over them; but it is dangerous to infer that the higher officers were participants in abuses which it is pretty evident that they were unable to prevent. Mr. Potter on his accession found the fifteen per cent contracts in force, and protested against them. He objected to the stone used, and opposed the continuation of the building in it. Mr. Hill in his turn protested against the contracts and succeeded in modifying all but two. One of these two was the Chicago contract, which was not abrogated, said Mr. Hill in one of his reports, because the work under it was nearly finished, and because so many alterations had been made under it by order of the Secretaries and in pursuance of the recommendations of commissions, that to have changed the system at that point would in his judgment have opened more leaks than it would have stopped.

THE rather farcical effect of the proceeding is heightened by the fact that at the time specified in the indictment Mr. Potter had been some weeks out of office, and by the statement which comes from Washington that, whereas the eight offenders are charged with conspiring to fraudulently pay Mueller $850,000, the whole amount paid him since the date named has been less than $500,000. These slips do not necessarily invalidate the essential part of the charges, but they seem to indicate haste and want of consideration in the preparation of the indictment, which, therefore, is certainly discredited by them, and which really looks much as if it were thrown out to see whom it could bring down, as a boy throws a stick into a tree full of apples. Without assuming to decide in advance of the courts, we say we can see no great likelihood that important evidence has been discovered which was not to be had last spring, or that upon what was then known an impartial court will reverse the decision of the Treasury Department. The whole trouble took its rise in the fifteen per cent contracts — contracts which were expected to be beneficial to the Government, but proved in the end to be in a different way disastrous to it. They were arranged by the then Supervising Architect, Mr. Mullett, an officer who thought more of the quality of his work than of its economy, but were executed by the Secretaries of the Treasury themselves, after due consideration, and after examination by the Solicitors of the Department. If, therefore, they were fraudulent as the indictment declares, the Secretaries must be considered as accomplices to the fraud, and the presentment should logically include them, as certain ambitious newspapers have made it.

GENERAL DI CESNOLA'S brother and the successor of his investigating fervor, Major di Cesnola, has not found the way of the excavator so easy under the English protectorate of Cyprus as did his predecessor under Turkish rule. The newspapers have been publishing various accounts of his arrest by the English Commissioner, Colonel White, for excavating without authority. The arrest was under a Turkish law, which was promulgated in 1874, while General di Cesnola's researches were going on, though the General contrived not to be troubled by it, and which forbade anybody from excavating for antiquities without permission both of the authorities and of the proprietor of the excavated land, under penalty of fine or imprisonment, and the confiscation of his findings. A discharged or disaffected servant complained of the Major's digging, which had not the permission of the authorities, now English; and under a recent order of Sir Garnet Wolseley reaffirming the Turkish law, his house was entered and his museum put under seal. He was arrested, sent to the jail, and fined, and his collection declared confiscated. He submitted under protest and was immediately released, and the fine remitted. Major di Cesnola entered a variety of pleas, it appears, some to the point and some not, — that he was an American subject, and not answerable to a tribunal which was neither Turkish nor English; that there was no proof that his digging was not for agricultural purposes, or that his collection was acquired by digging; that the collection was acquired before the issue of Sir Garnet Wolseley's order; and that the proceedings were an outrage; — but the decree of confiscation was upheld, and he has appealed to the protection of the U. S. Consul at Beirut.

WHETHER the law has been enforced against Major di Cesnola in an offensive manner, will doubtless be made known through his appeal to our consul, which will furnish material

for a pretty consular quarrel. That the English in their protectorate should enforce the Turkish laws is, we believe, one of its conditions; and they will probably enforce them better than the Turks themselves. If in this process they are led into offence and trouble "through the overzeal of a subordinate agent," as Mr. Hepworth Dixon writes, this is no more than often happens. It is likely that they will wish to reserve the privilege of digging up treasures for themselves; and not at all likely that the amusing but rather high-handed system of browbeating, which General di Cesnola applied to the Turks with such success, will be found effective with them. The pity is, as this quarrel reminds us, that almost all the territory in the world which is rich in classic remains is in the hands of the Turks, whose policy is that of the dog in the manger. They have a religious contempt for archæology and despise the remains of antiquity, except as metal for the melting-pot, or stone for the lime-kiln or for building. But they see that Christians value these things, and the mere instinct of cupidity prompts them to be tenacious of the things that other people want. Their tenacity and gradually awakening cupidity are of a kind to bring the archæologists to despair; for while they in no wise interfere with their continual destruction of the things that are precious to him, they are an obstinate bar to his getting at them, either for possession or for study.

Mr. Walsh, to whose superintendence of the St. Louis Custom House we have more than once alluded, has written to us to complain that in our paper of November 2, wherein we recited the justification of his career which was published in the *Cincinnati Gazette*, and noticed the strong letter of the Missouri judiciary exonerating him from the charges of collusion with contractors which had been brought against him, we nevertheless failed to credit him with having vindicated the quality of his superintendence, as he claimed to have done, and left him under an unjust suspicion of neglect or incompetence. We said at that time as much as we felt justified in saying by the evidence then at our disposal, which seemed to indicate that the work was visibly inferior to what it was intended to be, for which, of course, responsibility lay upon the superintendent. Since Mr. Walsh's letter was received, however, we have taken pains to get information from the Government, and our inquiries have shown that the evidence we had received was misleading. It does not appear that the piers concerning which the accusations were made were required by the specifications to be of solid cut stone, nor that any solid bonding of them was shown by the drawings; but it seems that the superintendent was empowered to have them constructed according to his judgment, and that they were adjudged to be sufficient and satisfactory by the Supervising Architect, after examination by himself and by the inspectors specially appointed for that purpose. So far as we can learn, then, Mr. Walsh has been altogether exonerated from the charges that were brought against his superintendence, and we are sorry to have been misled into implying that he had not.

We had intended in an earlier number to call the attention of those of our readers who might overlook them, to two articles by Professor Norton in the *Atlantic Monthly* for November and December, entitled "Florence and St. Mary of the Flower." They give, in very interesting form, the chief events of the history of Florence in the fourteenth century, grouped about the story of the building of her cathedral. Their picture of the condition of Florence at that time is very lively, and their account of the building of the cathedral doubtless the best that is to be found. Since they are in great part the fruit of personal research, they contain material that has, we think, never before been brought together. Certainly they give information that is not accessible to Americans in any other form, and that well deserves the reading of whoever is interested in the history of architecture. So far as we know, they are the most important as well as the most interesting contribution to architectural history that has been made on this side of the ocean.

Mr. Whistler's libel suit against Mr. Ruskin for his savage and contemptuous criticism of his pictures has been decided by an award of one farthing damages without costs. This is variously interpreted by commentators, according to their sympathies, as implying that the criticism was not much more than the pictures were entitled to, or that Mr. Ruskin's criticism is innocuous. Whichever may have been the view of a British jury, it is clear that they did not consider Mr. Whistler injured, and that he can have got but small comfort out of his lawsuit. The Philadelphia *Telegraph* ingeniously suggests that the effective retaliation of Mr. Whistler would have been to manage to set Mr. Charles Reade upon Mr. Ruskin, by which he would not only have shown the world an edifying combat between two masters of personal abuse, but would probably have made Mr. Ruskin as uncomfortable as Mr. Ruskin had made him.

ARCHITECTS' RISKS.

The subject of the responsibility of architects for the quality of the work done under their direction is one which could hardly be fully discussed in an hour or two of one session of an architectural convention. Nevertheless some of the points which were brought out in the discussions of the Institute were of much interest, and they raise a broad question which, while it is of much importance in determining an architect's relation to his client and to the public, is liable to come up at any moment in practice, and does come up not infrequently in isolated cases, but has never been formally decided as a point of general usage, probably because it has not as a general question been clearly enough and often enough presented. The question is, How far does an architect's responsibility extend? — that is, not to what point of pecuniary or personal liability, but to what assurance of the perfection of the work done under his direction.

It is not the practice of the courts in this country nor the habit of ordinary clients to push this responsibility to an extreme; yet there are many clients who assume that an architect's superintendence implies a warrant for complete excellence in every particular of the work, and there are architects who are ready, in theory at least, to accept a plenary accountability for every detail of work which they supervise, as much as if they had executed it themselves. That a client, who wishes to be sure that his work is well done, and who does not very well understand the conditions under which an architect works, should hold this view until he is otherwise instructed is not unnatural; but in an architect, as business is actually done, it seems to us a little Quixotic, and to require, before it can be safely carried out, a considerable modification of the conditions of ordinary practice.

Where an architect superintends work two theories of his function are possible: one is that he is not only the director, but the absolute and responsible controller of the work to its minutest details; the other, that he is its director and supervisor, but is responsible only for planning it rightly, for giving right and sufficient directions for carrying it out, and for using due care in seeing that the execution of it is satisfactory, without undertaking to warrant it in all particulars. Now either of these views is practicable and intelligible; but they require that the whole of an architect's business management shall be adjusted in harmony with whichever prevails. There doubtless is a certain convenience in having, in any important charge, one person made accountable by law or by agreement for every fault, whether his own or another's, and this person may, for convenience sake, be arbitrarily chosen. Of course an architect may assume such a liability, and the course of the discussion to which we have alluded seemed to indicate that some were disposed to assume it or to think that it ought to be imposed. It is worth while to consider what are the necessary conditions of this liability. Obviously if an architect is to be held liable for every fault of contractor or workman he must be perfectly autocratic and independent in his management of them. He must have the unimpeded selection of his builders, whose work must then be done with no communication from the client except through him. He ought not to be expected to give a contract to a man in whom he has not full confidence, but who is the lowest bidder in a competition; and he should have as minute control through his contractor as the contractor has through his foreman. His supervision must therefore be minute and incessant; one visit a day to a building will by no means do, nor will two. All this is necessary for his own protection if he is to assume such extreme liability, and as a consequence his pay for the amount of work which it demands from him ought to be proportionally increased. The one and a half per cent which ordinary practice allows for superintendence out of the established fee of five per cent is not nearly enough for this sort of supervision; and if it were the actual habit to exact such liability, the architect would have to insist on an increase

of fees, or else simply to run for luck. As a fact, the actual habit is to work on the other theory. The architect assures himself by due diligence that the general character of the work and the execution of the important parts, and of such subordinate parts as he is able by reasonable watchfulness to scrutinize, are satisfactory. He infers that what he has not been able to see is done with like faithfulness, and that he has been able to see enough to make him fairly sure of the rest. This is what he really means when he gives his certificate, and this is as much as the ordinary client is willing to pay for or finds necessary.

The question may be asked, and was asked in the discussion, Who, then, is to guarantee to the owner perfect work? The natural answer is, The man who does the work, — when an absolute guaranty is required. The man who has the power to absolutely control the quality of the work in every particular, and who also has the temptation, if any one has, and the opportunity, to slight or deteriorate it for his own profit, is the man who may in reason be enforced to provide a guaranty for its excellence; the client is foolish, and the architect negligent or dishonorable, who is willing to intrust it to any builder from whom such a guarantee is not to be expected. The architect may be called upon to guaranty his own work; to warrant, that is, the sufficiency and excellence of his design, drawings, and directions, and due diligence in superintendence; what is due diligence, that is, in legal phrase, "ordinary diligence," being a question to be determined by the standard accepted in the ordinary practice of good architects. Though it is often tacitly assumed that ordinary diligence, or due diligence, for which the ordinary fee is paid, will insure work perfect in every detail, this is too much to expect of it. It will secure a good average standard of execution; but to insure that there shall be no fault in any part requires extraordinary diligence, for which an extraordinary fee should be paid; and even that will not always do it, under pressure of the contract system, under which most of our work is done. Builders know this, if their clients do not, and the careful contractor who becomes responsible for the work of his sub-contractors reserves to himself, not a premium of one and a half per cent. the architect's fee for superintendence, but five or ten per cent, to repay him for his necessary trouble and risk.

The truth is that such a guaranty, from any one but the person who actually does the work, is of the nature, not of a professional service or of the duty of an agent, which the architect is, but of an insurance. The architect who offers it simply assumes to insure his client against loss, — takes the risk of the contractor's eluding him at some point, which he may very possibly succeed in doing, in spite of even more than ordinary watchfulness; that is, he takes an insurance risk in addition to assuming the care which he is professionally bound to take of the work, and the liability for his own share of it. It is open to the architect to take this risk if he chooses, but as it is solely a business risk it should be paid for by an insurance premium. If the owner wants such an insurance he may as well get it from a company, or from an individual whose business it is to take risks, as from the architect, who, after he has done his professional work with due care, since he is commonly not a capitalist, had better refrain from such speculative ventures. The view, in fact, which includes such an insurance is a purely commercial view, and not a professional view; and it is best for architectural practice in the long run, as well as for other professional work, to eliminate the commercial element from it as much as is practicable. For an architect to guarantee the work of a contractor because he directs it is scarcely more reasonable than for a physician to guarantee a cure or a lawyer a successful suit, since in each case there is an element in the result that is not under absolute control of the practitioner. The architect, it is true, has an advantage over the lawyer or physician, and excepting under unfavorable conditions can assure that the general standard of his client's work shall be satisfactory and its essential character good. If he does not accomplish this he may be charged with negligence or incompetence, and punished for malpractice; but this is a very different thing from giving a guaranty, which is no guaranty at all unless it is absolute and covers everything.

As for the builder, the effect upon him of knowing that his liability is assumed by some one else can hardly be other than demoralizing. It is one of the worst evils of the contract system to which we are committed that it diverts his efforts from doing his work as well as he can to merely doing in the easiest way what is absolutely exacted of him. If it became the rule of practice that the architect should be liable for the builder's work, we may be sure that the responsibility would slide from his, the builder's, shoulders altogether, and the architect, unless in exceptional cases, be obliged either to give himself up wholly to watching his contractors, to the sacrifice of his professional attitude and the injury of his proper work, or else do a speculative business in building-risks.

If attention had not been specially called to this view of the question, we might have felt that to argue at length against it was something like beating the air, since the actual practice is unquestionably in favor of leaving the ultimate responsibility where it naturally belongs, holding each man as the first security for his own work; but there is certainly a tendency among many clients to press the doctrine of the plenary liability of architects; and there are architects who, apparently without considering duly where it leads, are tempted to receive it with an encouragement which is more chivalrous than judicious.

THE OPEN FIRE-PLACE. IV.

BRAZIERS AND PORTABLE FIRES.

IN milder climates we find the portable brazier without any provision whatever for the outlet of the smoke. This system of heating was generally employed by the Greeks and Romans. It is still used in Spain, Italy, Algeria and other warm countries.

Fig. 7. From Joly.

The braziers of the Greeks and Romans formed elegant pieces of furniture, often beautifully sculptured, as in Figs. 7 and 8. The Spanish portable brazier, Fig. 9, in which charcoal is burned, is rolled from room to room, warming each in succession. By this system the entire heat of the fuel is realized, but, on the other hand, the products of combustion, always disagreeable to the occupants, and highly injurious to the paintings and furniture, are extremely dangerous for the health.

The combustion of one kilogram of coal, for instance, converts into carbonic acid all the oxygen contained in nine cubic meters (or yards) of air. This, according to Peclet, renders twenty-seven cubic kilograms of air unfit to breathe, so that the air of our room 20 × 20 × 10 feet, or of about one hundred and ten cubic meters capacity, deducting furniture, would be rendered irrespirable and would suffocate the persons attempting to breathe it, by the combustion of about four kilograms of coal. It is true that the heat generated by this quantity of fuel burned in the middle of a closed chamber, without chimney or other opening, would soon be so excessive as to require the opening of the windows. The four kilogram would raise the temperature of our room to $\frac{4 \times 7000}{110 \text{ m. c.} \times 1.3 \times 0.2377} =$ 823 degrees centigrade, or about 1500 degrees Fahrenheit, which would be nearly hot enough to melt brass. (In the equation, 7000 represents the heating power of coal in units; 1.3 the weight of 1 m. c. of air at 0° C.; and 0.2377 the specific heat of air.)

Fig. 8. From Joly.

The real danger results from the production of carbonic oxide, which gives much less heat. It is calculated that a hundreth part of this gas in the air is sufficient to kill warm blooded animals. Hence the danger of using charcoal for fuel as in the Spanish brazier, the products of combustion being largely carbonic oxide. A remarkable instance of death by charcoal fumes is given by the suicide of the son of the celebrated chemist Berthollet. He left us a vivid account of his own destruction by asphyxia in an air-tight chamber. Locking the door of the room and closing up all the cracks which might admit fresh air, he prepared a charcoal fire on a brazier, seated himself at a table with writing materials and a seconds marking-watch, marked the precise hour and then lighted the charcoal on the brazier before him. With all the method and precision of a scientific experiment, he recorded the various sensations he experienced, detailing the approach and rapid progress of delirium, and as suffocation began the language became more and more confused, the writing larger and more illegible, until the writer fell dead upon the floor.

Fig. 9.

In colder climates, where greater heating power is necessary, the brazier is of course insufficient. In the frigid zones, however, where wood and coal cannot be obtained, the brazier reappears in the form of the smoky lamp of the Laplander and Esquimau. Here economy approaches its maximum, the heating, lighting, and ventilation being

effected by one and the same inexpensive agent, namely, putrid oil, burned under a hole in the roof of the hut. "The Greenlander," says Tomlinson, "builds a larger hut and contrives it better, but it is often occupied by half a dozen families, each having a lamp for warmth and cooking, and the effect of this arrangement, according to the remark of a traveller, 'is to create such a smell that it strikes one not accustomed to it to the very heart.'" The effect of this great economy, however, is shown in the bleared eyes and the stunted growth of the natives.

Finally, the last degree of economy in warming, if we can call that economy which saves fuel at the expense of health, is reached by the lace makers of Normandy, who work warmed by the natural fires burning in the bodies of their domestic animals. They rent the close sheds of the farmers who have cows in winter quarters. "The cows are tethered in a row on one side of the shed, and the lace makers sit cross-legged on the ground on the other side with their feet buried in straw. The cattle being out in the fields by day, the poor women work all night for the sake of the steaming warmth arising from the animals."[1]

We wonder at the backwardness of the civilized Greek and Roman in the use of their tripods, smile at the Spaniard with his barbarous rolling brazier, pity the Esquimau with his feeble and smoky lamp, and sympathize with the wretched lace makers of Normandy in their close and sickly atmosphere, yet all the time forget that we ourselves allow the air of our rooms to be impoverished in the very same manner, and often to an even greater extent, by the noxious vapors pouring from our unventilated gas burners.

ORIGIN OF THE CHIMNEY.

The idea of building the fire-place against the side wall probably originated in England in the eleventh century, at the time of the

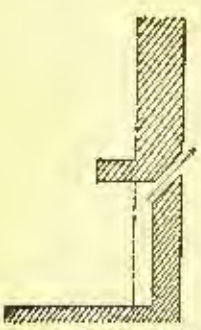
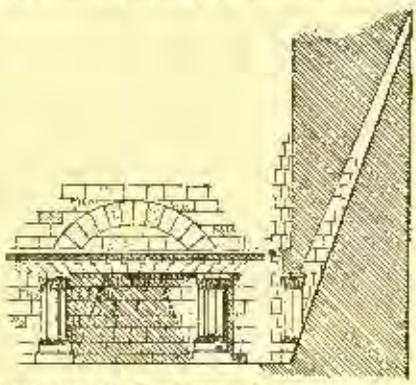


Fig. 10. Origin of the Chimney. From Lebrête.



Figs. 11 and 12. Fire-Place in Conisborough Castle. From Tomlinson.

Norman Conquest. Previously the chimney consisted merely of a hole in the roof, with a small wooden tower above to carry up the smoke. At the time of the Conquest, fortresses were constructed and the roofs used for defence, so that the central opening for smoke was rendered impossible. The fire-place was removed to an outside wall and an opening made in this wall above the fire for the passage of the smoke, as in Fig. 10. The oblique opening in the wall gave place soon after the Conquest to the ordinary chimney-flue. Figs. 11 and 12 represent the fire-place and flue in the great guard room of Conisborough Castle, erected in or near the Anglo-Saxon period.

Fig. 13. Fire-place of the Fourteenth Century. From Viollet-le-Duc.

This form of flue naturally led to the ordinary chimney as it is now constructed. The fire-places and flues were at first very large. In France a royal edict, as late as 1712 and 1723 fixed the size of the flue at three feet wide and deep enough to admit the chimney-sweep. In this country we have seen old-fashioned fire-places eight feet long and three feet deep.

[1] Tomlinson, *Warming and Ventilation.*

These caused such a draught that screens were necessary in the room to protect the inmates from powerful currents of cold air, but, although the waste of heat was enormous, on account of the cooling effect of these strong draughts of outside air, it was nevertheless much less in proportion to the fuel burned than is the case with the smaller

Fig. 14. Fire-place of the Fifteenth Century. From Viollet-le-Duc.

modern fire-places. Provided usually with a large hood projecting boldly into the room, and placed at a considerable height, sometimes six or eight feet, above the hearth, Figs. 13 and 14, they radiated the heat generously into the room, and, although they did not pretend,

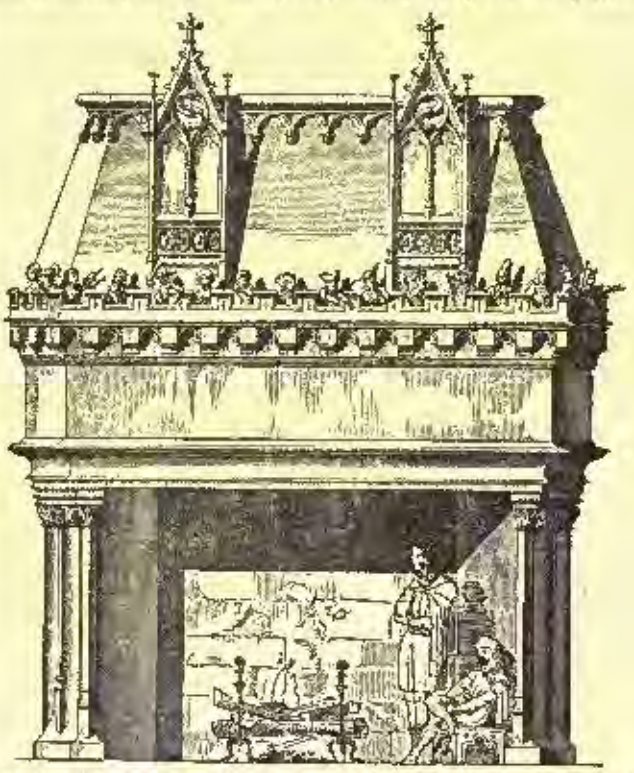
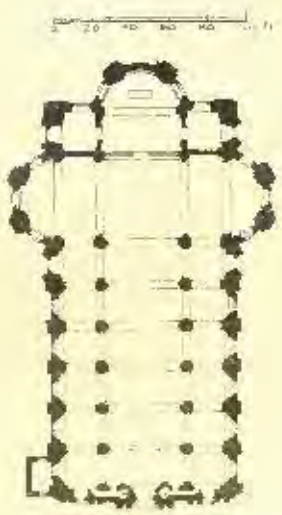


Fig. 15. Fire-place in the House of Jaques Coeur, Bourges. From Gailhabaud.

any more than do our modern fire-places, to heat the air of the apartment, they at least sufficed to warm amply the persons grouped around them or seated on the hospitable benches built upon the hearth itself.

As for smoke, it is undeniable that where but a small fire is required, as is usual in our smaller modern rooms, and the fire-place and flues are large, the hot air current is greatly cooled by the cold air entering above the fire, and the rapidity of the draught is proportionally diminished. It is of course thereby rendered less capable of resisting any impediments to its passage which may be offered in the form of defective construction of the flue or imperfect ventilation of the apartment. But where the flue was perfect, and where sufficient air was brought into the room to supply the place of that drawn up the chimney, and where the hood projected well over the fire, a smoky chimney was found to be a rare occurrence, even with the largest fire-places and with the smallest fires.



DESIGN FOR THE REBUILDING OF THE CATHEDRAL AT CAPE HAYTIEN. REPUBLIC OF HAYTI.

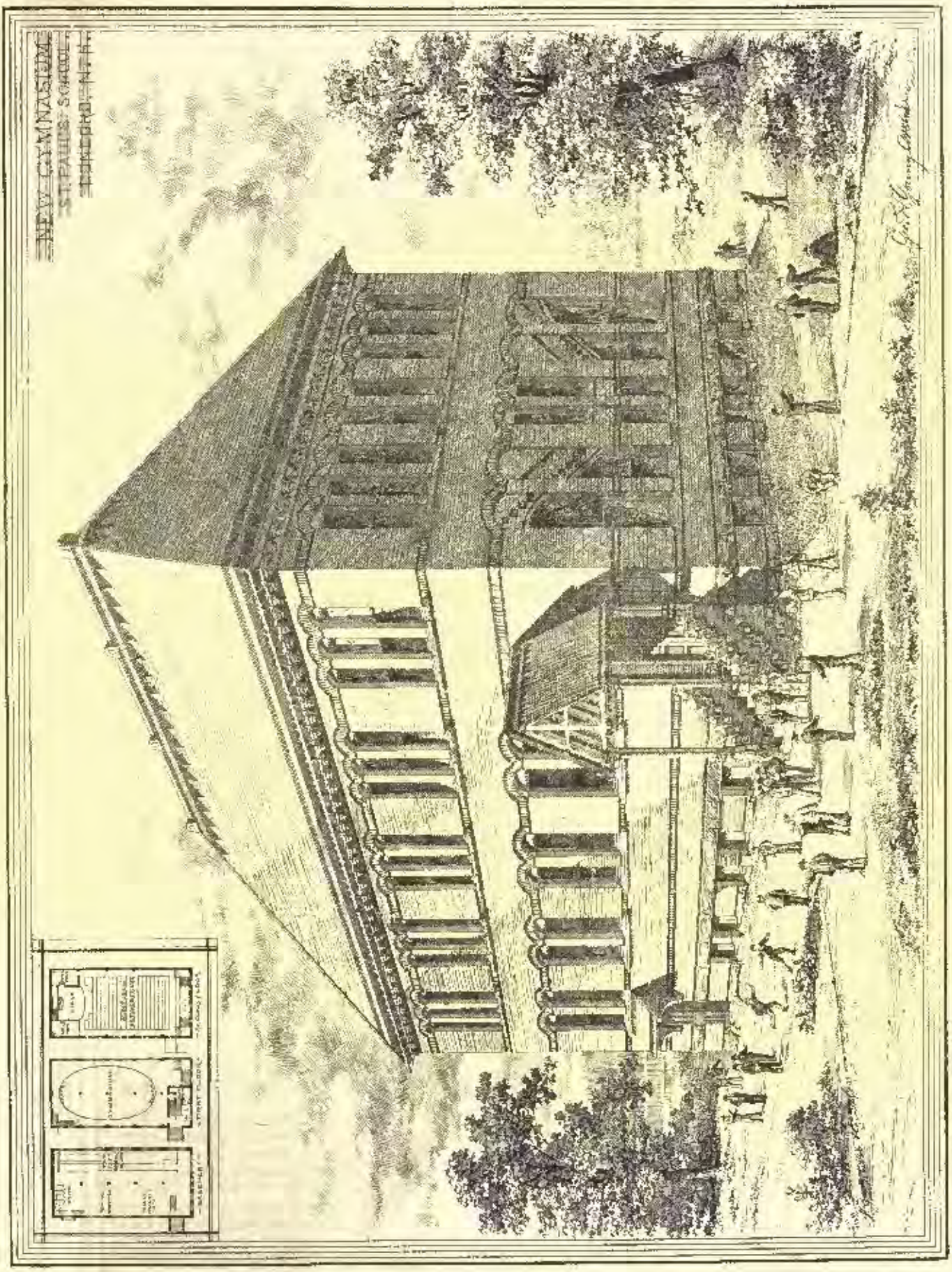
BUILT 1748–1774
DESTROYED BY FIRE 1802
RESTORED 1835
DESTROYED BY EARTHQUAKE 1842
SECOND RESTORATION COMMENCED 1878

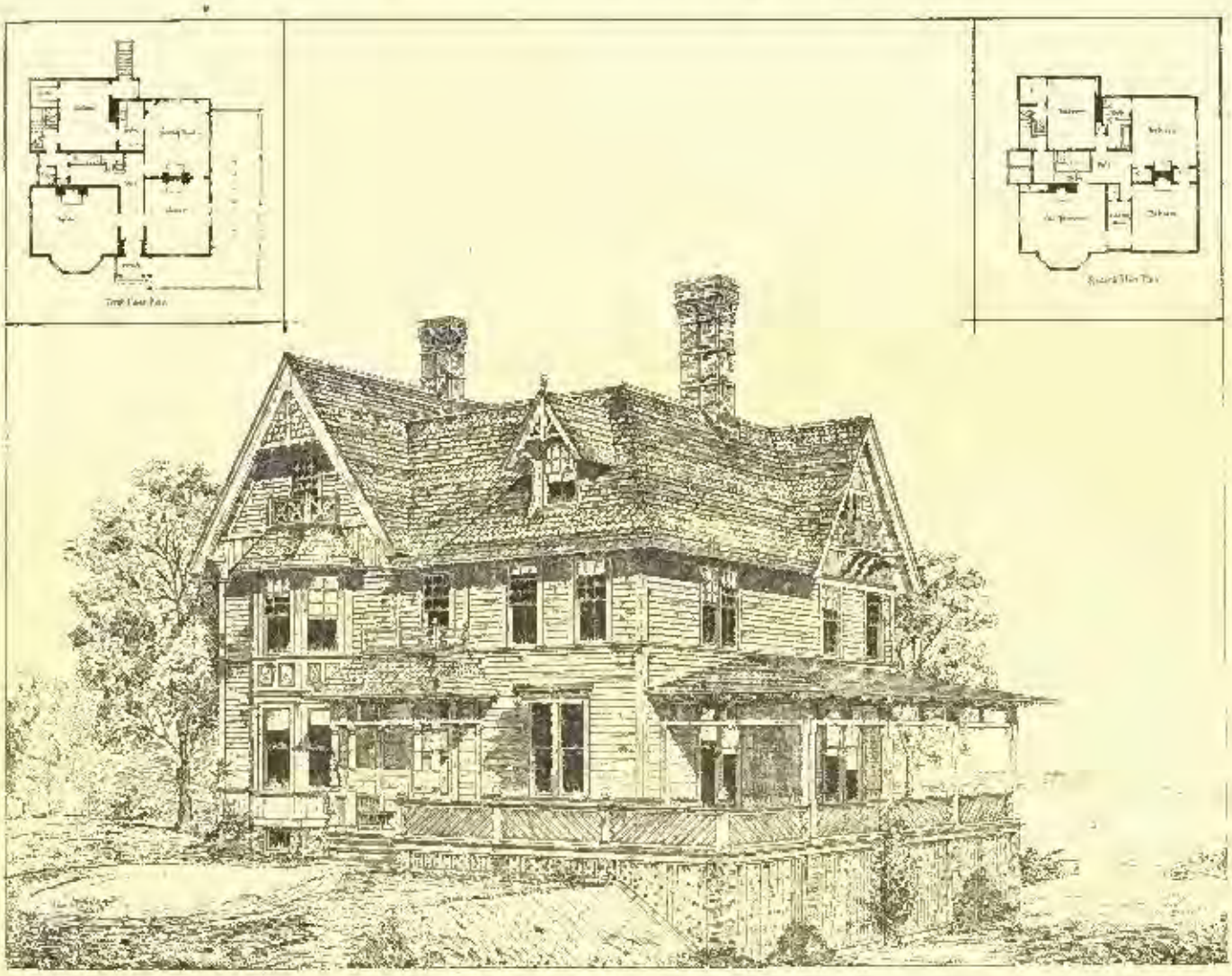
CUMMINGS AND SEARS ARCHTS.
BOSTON.

THE HELIOTYPE PRINTING CO. 239 CONGRESS ST. BOSTON

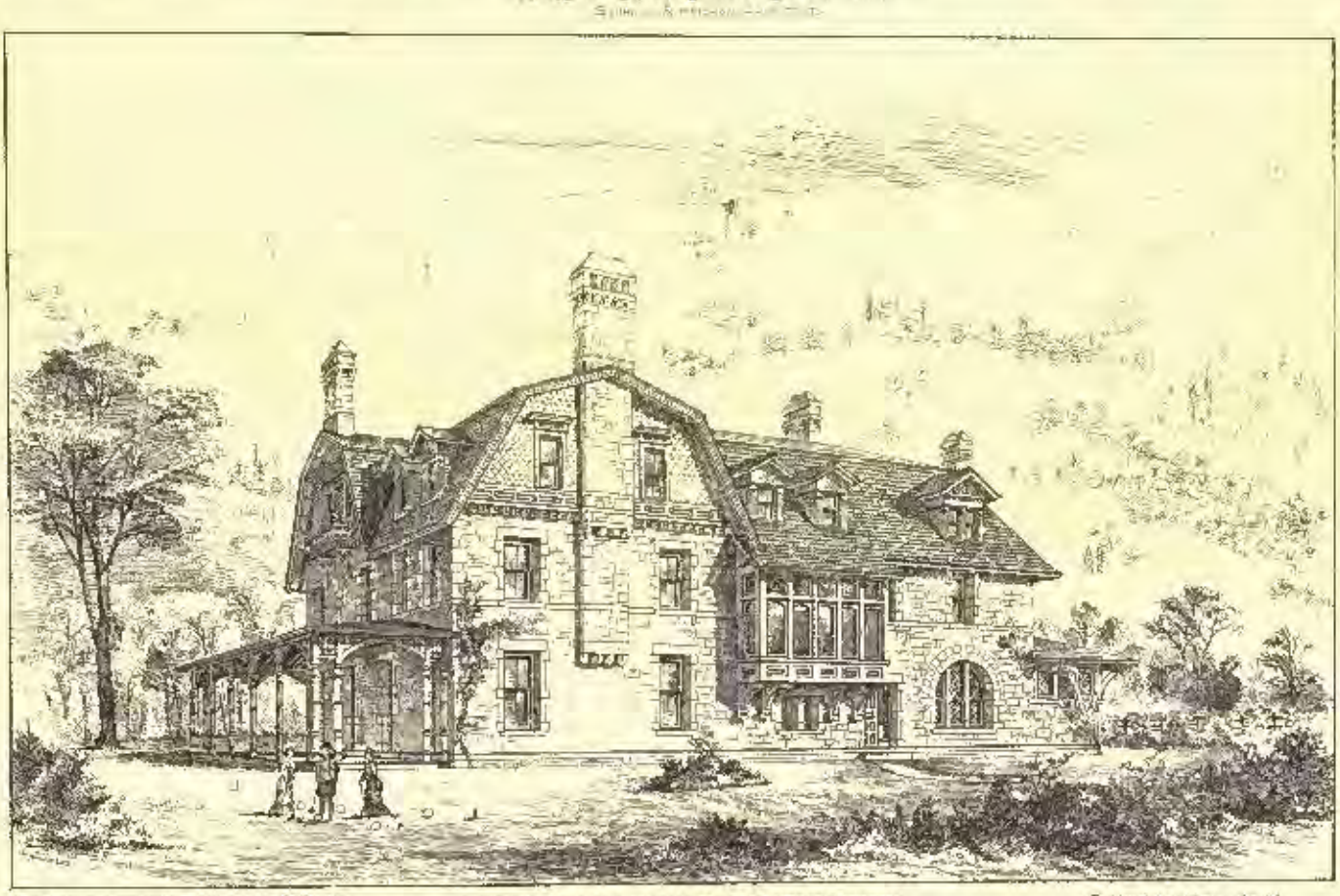
FRONT ELEVATION.

BUILDING FOR BUREAU OF ENGRAVING AND PRINTING:—WASHINGTON, D.C.
TREASURY DEPARTMENT


NEW GYMNASIUM
ST PAUL'S SCHOOL
CONCORD N.H.



HOUSE OF DR. VIOLLET GIRDS [illegible]



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HOUSE AT SNEEDENS-LANDING, ON-THE-HUDSON, NEW-YORK.

J. Cleveland Cady, Archt. N.Y.

It is the custom when one of these ample fire-places, built after the old-fashioned style, is found to smoke, to lay the blame to the size of the opening and flue, although nine times out of ten the real fault will be found to be in an insufficient ventilation of the apartment, or in a careless or irregular construction of the flue. Hebrard, in his "Caminologie," wrote in 1756 as follows: "It is surprising that we should allow these old chimneys to be changed in order to follow the fashion of the day, without taking the pains to examine whether the utility is as great as the novelty. It appears that it is not. It has been observed, on the contrary, that of the few old chimneys which have escaped remodelling, there is scarcely one which smokes. Old men testify to the same effect in regard to those which existed in their time, while we have no hesitation in saying of the majority of our new chimneys that they do smoke."

The cause of this change was the suppression of the hood which had been built and recommended as of the utmost importance by Alberti, Philibert Delorme, and others. The hood was dropped partly because it was thought to interfere with the decoration of the apartment and partly on account of the desire for novelty. Figs. 15 and 16. Unfortunately this modification involved a second which had a

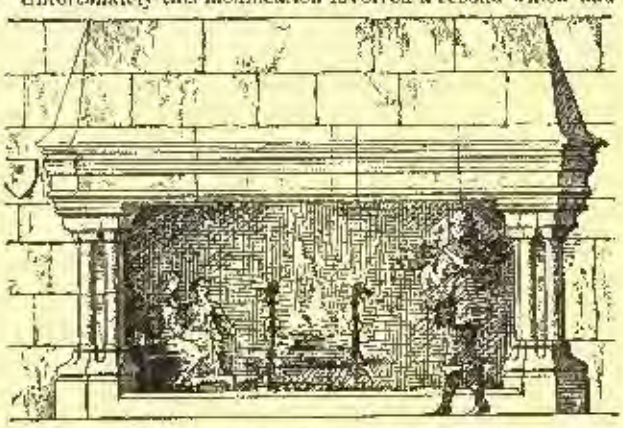

Fig. 16. From "Ancient Domestick Architecture."

still more injurious effect upon the heating power of the fire. The smoke being no longer properly conducted to the flue, would under adverse circumstances enter the room, and the device of lowering the mantel was adopted to obviate the difficulty. This was done at first by adding a simple band of leather or of some other material below the mantel shelf, then by movable registers or blowers of metal, and finally by lowering the mantel and shelf itself, which modification, in the course of the eighteenth century brought the fire-place down to the form commonly met with in our day; a form which, objects Labarthe, "utilizes neither the radiant nor the transmitted heat." Still another reason was given for the lowering of the mantel. It was urged by Serlio and Savot that this new disposition had only been introduced to protect the eyes from the heat of the fire. It was, however, argued with all apparent reason, by Hebrard, that the object sought could not in the least degree be obtained by this means, since it would be necessary for the purpose to give up chairs and warm one's self standing up.

I shall endeavor to show in the next chapter in what way these large, old-fashioned chimneys may be constructed, either with or without the hood, so as to render the draught, in all cases, both ample and unfailing.

THE ILLUSTRATIONS.

THE CATHEDRAL AT CAPE HAYTIEN, ST. DOMINGO, AS RESTORED BY MESSRS. CUMMINGS AND SEARS, ARCHITECTS, BOSTON.

THE Cathedral of Cape Haytien, in the Island of St. Domingo, has had a checkered history. The first church, built some time prior to 1680, a rude structure of palmetto logs with a thatched roof, was burned by the Spaniards some ten years later; but so rapid is the decay of green timber in that moist climate that it was said to be already half ruined. In the space of thirty years three more churches of similar materials were built and destroyed. At length, in 1715, the corner stone of a more substantial structure was laid, the walls being of masonry. It was consecrated three years later, but after twenty years it was threatening to fall, and was abandoned for a temporary shed built in the public square. From time to time irregular and languid operations were carried on towards its restoration; but it was found impracticable, and in 1748 a new church was commenced, still on the old site. This also had its vicissitudes, being unable to stand up till it could be finished. It was, however, finally consecrated in 1774, with great pomp. Its front was, judging from descriptions and drawings still in existence, substantially that of which a drawing is here given; but there was no dome, and the ceiling was apparently finished with an open roof. This church stood until 1802, when, on the landing of the French expeditionary army, sent out by Napoleon to crush the formidable insurrection, the church, with most of the city of Cape Haytien, was burned by order of Toussaint l'Ouverture. It was restored once more in 1838, only to be shaken into ruin by the great earthquake of May 7, 1842, which destroyed the entire city. Work has been carried on at intervals by various successive governments with a view to its restoration, but no systematic attempt has been made to put it in a condition to occupy, until the administration of President Canal came into power in 1876, when a commission was appointed "for the rebuilding and completion of the Cathedral of the Cape." Messrs. Cummings and Sears, of Boston, were instructed to present plans and estimates for the completion of the church; and after sending out an experienced mason, who made a thorough survey of the condition of the walls and piers, with measurements of every part, tenders were invited for the work. That of Mr. H. D. Clement was accepted; but the first contract included only that portion of the church in front of the dome, a temporary but strong wooden framing being erected across the rear end of the nave and side aisles. Mr. Clement went out himself with a strong force of carpenters, Mr. Farquhar with a gang of slaters, Messrs. Michael and Sumter as stone-masons, and Mr. J. W. Oldham as general superintendent or clerk-of-the-works. Mr. Oldham arrived in Cape Haytien on the 23d of December, and left on the 23d of May. Between those dates two of the great piers of the nave, six feet square and twenty-five feet high, were taken down and rebuilt, the wall above being shored; a low clerestory wall above the nave cornice was split and carried up four feet in height, the nave roof, one hundred and fifty feet long and fifty wide, put on and slated, the aisles roofed with hard pine rafters filled in with plaster blocks and covered with Portland cement for a promenade. The pavement of nave and aisles was laid in freestone blocks, the nave roof finished with a barrel vault deeply panelled, the aisle roofs with flat panelled ceilings, all in white pine. The old front of the church still existed as high as the cornice of the first order. Mr. Clement's contract not providing for the completion of this frontispiece, a wall of brick-work, two feet thick, was carried up to fill the opening of the gable, and to serve as a backing for the stone-work when that shall be added. The doors and windows have been sent out since the return of the workmen. Besides all this a great amount of masonry work was done in cleaning and repairing the stone-work of the front and side walls, much of which was broken by the earthquake. These walls, by the way, were faced with a beautifully white and fine sandstone brought from France when the church was first built, and much resembling the Caen stone with which we are familiar.

The work here mentioned exhausted the means at the disposal of the commission. It is hoped, however, that additional appropriations will be made by the legislature this winter by which the work may be completed. The bell-tower shown in the elevation here given formed no part of the original design, but was one of two flanking towers built at different times and carried to different heights. The architects recommended the removal of both, as detracting from the dignity and consistency of the front. It was, however, determined to retain one of them, and to complete it by the addition of a belfry stage as here shown. The dome is intended to be built of iron, the ever-present danger of earthquakes making it imprudent to carry any work of masonry so high above ground.

The city of Cape Haytien, of which this church is now the only important building, has had a history not less eventful than that of its cathedral. Founded by French colonists in 1670, a hundred years later it was a beautiful capital with a population of some twenty thousand people, with its arsenal, its public baths, its fountains, its theatre, its palace of justice, its hospital, — with a chamber of agriculture, a "*Société Royale des Sciences et Arts*," and a flourishing trade with France, England, and the American colonies. It was called familiarly "the little Paris." But domestic revolt and foreign invasion sapped the sources of its prosperity; and what these could not do, the convulsions of nature accomplished with extraordinary completeness. During the insurrection of the slaves in 1793, it was given up to the plunder of the troops, and on the landing of the French expeditionary army in 1802, was burned by the native general. Still, as late as 1827, Mr. Charles MacKenzie, the English Consul General, says, "the city is large, the streets spacious and well paved, and the houses chiefly of stone, with handsome squares, large markets, and a copious supply of water from fountains. Upon the whole the city is remarkably beautiful." But in 1842 the Island was visited by an earthquake which destroyed the town, and no traces of its former beauty are now to be seen. The extraordinary vigor and luxuriance of vegetation have covered the ruins with verdure; the wild fig-tree, with a trunk twelve to sixteen inches in diameter, is frequently seen growing from the top of a high wall, its strong roots having struck down on either side into the earth. The streets are still encumbered with the ruins of stone buildings, like the streets of Boston after the great fire. The workmen, in clearing away the masses of *débris* from under the walls of the cathedral, unearthed portions of skeletons, doubtless those of persons who had taken refuge in and around the church during the earthquake and were buried by the falling walls.

HOUSE, AT SNEDEN'S LANDING, N. Y. MR. J. C. CADY, ARCHITECT, NEW YORK.

This house is situated near the termination of the Palisades, which are indicated in the background, near a spot which abounds in historic association, Tappan of Revolutionary fame. The house is built of the cream-colored stone which forms a part of the singular formation of the lower part of the Palisades.

BUREAU OF ENGRAVING AND PRINTING, WASHINGTON, D. C., MR. J. G. HILL, SUPERVISING ARCHITECT OF THE TREASURY DEPARTMENT.

This building is to be at the corner of Fourteenth and B Streets and will have a frontage of 130 feet on the first and 234 feet on the second of these streets. It is to be built of common brick, with jambs and other finish of moulded brick. The brickwork will be of two colors, red and brown. The floors and roof will be fire-proof. The arrangement of the rooms is indicated on the plans. The estimated cost is $900,000. At present the basement walls are building.

GYMNASIUM, FOR ST. PAUL'S SCHOOL, CONCORD, N. H. MR. G. H. YOUNG, ARCHITECT, BOSTON.

THE LEGAL RESPONSIBILITIES OF ARCHITECTS. I.

[A paper read at the twelfth Convention of the American Institute of Architects, by Mr. T. M. Clark, Fellow.]

There is a great deal of confusion in the public mind as to the limitations of the responsibility of those who are employed to direct construction, and it is not impossible that architects themselves do something to increase the confusion, not so much from ignorance of what the law requires of them as from the readiness with which some, in their eagerness for employment, bind themselves to terms of excessive harshness, and perhaps also the ambition of some to claim an authority over clients and contractors more absolute than is always necessary or desirable.

There is a popular idea that the architect is somehow responsible, not only for his own work, but for that of all the contractors for a building. He is supposed to be in some way capable of watching at once all the workmen employed in the structure through the whole of their working hours, so that the mechanic who has been astute enough to conceal his bad mortar and rotten timber during the periodical visits of superintendence, passes for having only yielded to the impulses of human nature, while the architect, who failed to find him out, is denounced as incompetent.

Especially is the final certificate supposed to confer a sort of plenary absolution on the contractor who has managed to obtain it, and who thinks himself entitled to keep the profits, whether honest or dishonest, which he may have been able to secure by means of it, on the pretence that the architect's approval supersedes for him the faithful execution of his contract.

But if builders find it convenient to claim such preposterous authority for the acts of the architect, which are profitable to them, the public, on the other hand, seem to find difficulty in holding their agents, in matters of construction, to even moderate accountability, and their attempts to do so result in some cases in gross injustice to their professional adviser, and in others in such extraordinary contracts with architects as that which the Indiana State House commissioners have succeeded in getting one of them to accept.

It would be much to the advantage of the profession and the public if their mutual duties and responsibilities were better understood, and a reference to cases in which the law on such subjects has been established may be interesting, even if very incomplete.

The general rule of law in all cases of employment of professional advice is that the expert shall be bound to use in discharging his trust an ordinary amount of care and diligence, together with an average degree of skill and knowledge of his business. The highest degree of skill is not expected of him; but neither can he satisfy justice, as has been claimed, with such an amount of intelligence as may have been shown by great masters under unfavorable circumstances; what is required of him is a continued exercise of the best skill which, with ordinary talents and opportunities, he could be expected to attain.

Perhaps in practice want of care and diligence is more frequently imputed to architects than want of skill, and courts are stricter in interpreting the law in that respect. In an English case an architect, sued for negligence, replied that he found his instructions were disregarded by the builder with the approval of the owner, and thinking it useless to waste his time in frequent visits, he had only been to see the work about once a month afterwards. That seems not unnatural, at least; but the court did not find it justifiable, and judgment was given against him.

In general, it may be remarked that juries' notion of faithful supervision differs materially from what architects are apt to understand by "superintendence," and he who has a difficult or dangerous piece of construction or alteration to carry out, will consult his own interest, in view of the risk of accident, by being on the ground in person as much as possible, so that want of diligence at least may not be imputed to him.

As to want of due care and skill, there seems to be some variation in the practice of different countries.

The French Code says, section 1792: "If the edifice built at an agreed price perish in whole or in part by faults in its construction, even by defect in its foundation, the architect and the builder are jointly responsible therefor for ten years."

This is the law of France, and, in substance, of England and the United States. The French jurists make some further distinctions. It has been decided that the architect is solely responsible for damage or failure in a building which has been strictly carried out in accordance with his plans and under his directions, if the workmanship and materials were not defective; and this decision seems to overrule a claim which has been made, that the builder should be supposed to know as much of his own business as the architect, and unless he protested against a faulty design he should share in the responsibility for it.

Another decision extends the responsibility of the architect to all cases of damage which may result from a violation or ignorance on his part of the rules of the art which he professes, or of the laws which it is incumbent on him to know, such as those relating to party-walls, or ancient lights, or the police or municipal regulations of the locality in which he builds; and it has been repeatedly held that the architect could not free himself from this responsibility, even by alleging the consent or the positive orders of the owner.

As to the accountability of the architect for the bad quality of the work done under his supervision, there is no obscurity whatever. The law says: "If the architect is charged with the surveillance of the work of the contractor, he can be held for all the consequences of any negligence in his performance of this duty; so, whether it may be that the plan has not been faithfully followed, and the building is consequently defective, or the contractor has furnished bad materials or workmanship, those who suffer inconvenience from any of these deficiencies have a cause of action against the architect, subject to the limitation of the Code, which says (act 2270) that "after ten years architects and contractors are discharged from the guarantee of work furnished or directed by them in accordance with an agreement as to price," and, of course, provided they can show that the damage or inconvenience could have been prevented by the exercise of due skill and care on the architect's part.

This seems a hard doctrine, considering that the architect has no interest in permitting the use of bad materials, and can wholly prevent it only by extreme watchfulness, if at all, while the builder controls every detail of material and workmanship, and if those furnished are defective, it must be with his knowledge and collusion, and with intent to defraud the owner; and if he succeeds in his fraud the whole profit is his; but there is no doubt that it is the law in France and Great Britain, as well as this country, and a man who suffers from defective work in his house or other building, which might have been detected or prevented by what the court may consider reasonable care on the part of the architect, can recover damages from him. In the English and American practice it would seem that the architect is compelled to make good the whole loss if the owner chooses to require it, while the French courts seem to exercise a discretion in apportioning the indemnity between those to whose fault the loss is due. Thus, in a case where a bridge was washed away by a flood, the municipality sued the engineer to compel him to repair the loss; but the court decided that as, although the flood was an unusual occurrence, answering in part to what our books term an "act of God," still, it was within the reasonable skill that the law expected of the engineer, to provide against such occurrences, and his share of the responsibility was estimated at one fourth, and he was condemned to pay one fourth the damage.

In another case, a town built a hall, and six years after its completion the stone began to flake off. The municipality sued the architect and builder jointly. It was in evidence that some of the stones were placed off their natural bed; and although it appeared that it was difficult to distinguish the beds in that particular stone, the court held that the architect ought to have been able to do so, and that it was one of the rules of his art not to allow such misplacing, and he was obliged to pay one half the damages claimed.

One of the French commentators asserts the existence of an important rule, that if the superintending architect has given the proper direction for the execution of the work, and has, before the work is actually in place, pointed out defects in the materials on hand, he escapes liability. If he has not he is liable, but not as a principal. The principal is the direct cause of the damage, that is, the contractor or workman who by fraud or negligence has badly executed the work which was confided to him. He is the immediate cause of the damage, and should furnish the reparation. The negligence of the architect is only secondary and accessory, and he should only be held as a subsidiary, as a bondman in case of insolvency of his principal.

There seems to be some comfort in this; but without referring to the decisions on which the opinion was founded, it is impossible to tell how much authority it has. Certainly there appears to be no trace of such a principle in the English or American decisions, so that it is wisest for us to continue to think that a general supervision only is not enough to satisfy the law, and that in case of accident the courts will hold us, as the French say, *solidaires* with the builder in respect of damages, if any lack of due diligence or skill can be proved against us.

CORRESPONDENCE.

A CONTUMACIOUS BUILDER AND THE BUILDING DEPARTMENT.

New York.

The Superintendent of Buildings is just now engaged in a lively fight with one of the class known as "speculative builders." They are a numerous and most active company of business men, who know the law in its minutest detail, and who are commonly supposed to be

ready at all times to take advantage of every opportunity by which a dollar may be saved. The stock phrase "in a workmanlike manner" means in their practice that manner which will give the best return at the final sale of the building. Their edifices, be they stores, tenements, flats, or dwellings of the better class, are rushed up and hurriedly sold, while the gloss and varnish are yet fresh, and before the settling walls and general want of stability in the structure are shown in the cracked plaster and sprung wood-work.

Last spring plans were entered for a double apartment house at 37 and 39 West Fifty-third Street, on the north side of the street. It is a fine location, and the original permit was for a four-story structure; subsequently leave was granted to build a five-story building; but now when the case comes into court it is found that the papers have been altered and a figure "6" inserted, while the filed plans and sections show but five stories. Where or how this erasure was committed is not known. But as the plans on file are readily accessible to any inquirer, this alteration is not inexplicable. The law says in § 5, "In all dwelling-houses that may hereafter be erected not more than fifty-five feet in height the walls shall not be less than twelve inches thick, and if above fifty-five feet in height and not more than eighty feet in height the outside walls shall not be less than sixteen inches thick to the top of second-story floor beams, provided the same is twenty feet above the curb-level, and if not, then to under side of the third-story beams; and also provided that portion of the wall that is twelve inches thick shall not exceed forty feet above the said sixteen-inch wall; and in every dwelling-house hereafter erected more than eighty feet in height, four inches shall be added to the thickness of the wall for every fifteen feet or part thereof that is added to the height of the building. All party walls in dwellings over fifty-five feet in height shall not be less than sixteen inches in thickness."

The first violation complained of was the use of the party-wall on the east. It was but a twelve-inch wall above the offset at the level of the first-floor joists, and to make some appearance of complying with the law, and possibly because of some notion that even the strength of a twelve-inch wall is a finite quantity, an eight-inch lining was carried up, though unbonded, and built without any particular regard to the old wall. It contributed no strength to it beyond a slight lateral bracing. Above the second-story floor beams this was discontinued, and beyond that point not the least pretence was made of obeying the law, and the twelve-inch party-wall was carried up and pierced for beams, despite the protests of the adjacent tenant and owner, who happened in this case to be Mr. Wm. A. Beach, the eminent lawyer, whose residence is a five-story one; who carried his objections so far as to seek a temporary injunction. Judge Lawrence after a hurried hearing with the affidavits of the builder and his men that the wall was properly bonded and the delay was a grievous one, removed the injunction. Of course it is evident that the party-wall remains for all structural purposes merely a twelve-inch wall from the offset above mentioned to whatever height the builder may choose to carry it. Its bearing strength is not added to one whit by the wall of eight inches set by the new builders; and what the law never contemplated in any case, and particularly with party-walls, *i. e.*, the erection of a twelve-inch wall over fifty-five feet in height, is carried out.

The opposite or westerly wall exhibits in even stronger light the policy of the builder. The law plainly says that the sixteen-inch portion of the bearing wall shall cease either at the second or third story line of beams, and that from that point, wherever it may be, there shall not be more than forty feet of twelve-inch wall. To fall within this last provision the wall which had ceased to be a sixteen-inch wall at the level of the third-floor joists was continued for a space of a few feet. It was unbonded to the main wall, and was a most farcical pretext for claiming freedom from the penalties of the law. When the injunction was applied for the builder swore that this was a well-bonded and thorough wall; but once the order of dissolution was granted against the injunction, the builder became aware of the possibility that the wall might be examined, and the matter tested, therefore the whole length of four-inch lining wall was thrown down, completely removing, of course, any chance of a contradiction of the testimony. Another injunction was applied for, this time by the Department, but pending its argument the builder went on with his building, and it became evident that something more summary would have to be applied to such an impracticable; and for the first time in the present administration of the Department, or at any time so far as its records show, the section of the law which permits a criminal prosecution was enforced, and the builder with one or two of his associates was taken into custody. The summons server could not identify the papers served by him on the prisoners, and through this oversight a discharge followed. New complaints were at once made out and new papers served, and now the officers stand ready to arrest the first workman who shall attempt to lay a brick. The case is watched with no small interest by builders and property owners, and the Department for once is determined to show that there is such a thing as a building law.

W.

ROMAN REMAINS AT HEIDELBERG. — Since the discoveries of Roman remains reported last year, further evidence has been produced that Heidelberg was an important station for the legions of Rome in the third century of our era.

THE LATE FREDERICK PEPYS COCKERELL.

Our readers will receive with regret and surprise the announcement of the death of Mr. Frederick Pepys Cockerell, the Honorary Secretary of the Royal Institute of British Architects. We are no less grieved to have to announce this event, which deprives the profession of architecture of one of its best known and most valued members in the very flower of his age, and at a time when there seemed every prospect of a long and honored career before him. The intelligence has reached London so near the time of our going to press that it is impossible to give more than a brief account of a career and a character which would have well merited a longer and more complete notice.

Mr. Cockerell was one of the sons of the late Professor Cockerell, R. A., and a great deal of his professional training was under his father's eye. He also studied in Paris for some time. He became a pupil of Mr. P. C. Hardwick, and was the life and soul of a small group of young men who were being educated for the profession in that office at the same time, several of whom have since made their mark. In the winter of 1855 Mr. Cockerell left Mr. Hardwick and went to the Continent for a prolonged tour of study; he brought home a large number of excellent sketches and finished drawings, for he was a most accomplished draughtsman, and while in Italy he extended and enlarged his knowledge of the works of the great Italian masters of painting and sculpture. It would not have taken much at this time to induce the young enthusiast to lay down the tee-square and take up the brush, but happily his original idea was adhered to.

Soon after his return to England, Mr. Cockerell commenced practice, and he continued it with increasing success up to the date of his untimely death. His best known work was the Freemasons' Tavern, which he rebuilt, and Freemasons' Hall, which he recast. This work he obtained in competition, an early success, and one which led to his appointment to high Masonic office. The building, in Queen Street, Lincoln's Inn, will probably long remain to bear testimony to the refinement of taste and the skill of its architect. From the Catalogue of the British Section of the Paris Exhibition (Fine Art) we may extract a list of the works, photographs of which are there exhibited by him; it includes his best, but by no means all his important commissions: Crawley Court, Manchester; Down Hall, Essex; Borrowshea, Surrey; Freemasons' Hall, London; Lythe Hall, Surrey; Dunleaven; the Water Color Society's Gallery, Pall Mall East; Tombs at Algiers, Kensal Green, and Slough; Memorial Columns at Slough and York; Monument in St. Paul's; Chimney Piece at Chiefden.

Mr. Cockerell had a learned and a practical knowledge of all the fine arts, a cultivated taste, keen perception, and a great fund of energy and good sense. His social qualities were so brilliant and yet so kindly that those who knew him will regret the true friend, the acute critic, the brilliant talker (for, in a silent, newspaper-reading age, Mr. Cockerell was one of the very few men to be met in society whose natural and acquired talents of conversation were remarkable) the bright and cheerful man of business, the genuine artist, more, far more, than the accomplished rising architect. The precept, — one of the many wise and telling maxims which dropped from the lips of the old professor, his father, — "Be an artist among gentlemen, and a gentleman among artists," was the rule of his life, and no more gallant, chivalrous, generous gentleman, no truer, more conscientious artist, within the limits to which his predilections confined him, ever adorned the profession of architecture.

Mr. Cockerell's position and personal qualities years ago pointed him out as the fittest man available to fill the office of Foreign Secretary to the Royal Institute of British Architects, and when the duties of the secretaryship were rearranged, he became Honorary Secretary, his colleague, the Acting Secretary, being his old friend and former fellow-pupil, Mr. Eastlake. Mr. Cockerell acquitted himself well in this position. He discharged the duties, which at times were not always simple, with a fine tact and an easy manner that have helped to steer the Institute through rough water when that has had to be encountered; and his loss will be severely felt by the President and Council and by his present colleague.

Mr. Cockerell died in Paris on the 4th instant, suddenly, at the early age of forty-five. He leaves a widow and a young family. — *The Architect.*

THE OWNERSHIP OF DRAWINGS.

OAKLAND, CAL., November 12, 1878.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Sir, — Much has been written to show that the ownership of architectural drawings is vested in the architect unless a specific agreement has been made to the contrary. As to the justice of this condition, all in the profession know that it is based on the fact that drawings are simply a part of the architect's instruments, provided by himself to aid him in the accomplishment of certain ends, to wit: the estimate of cost and the construction of the proposed improvements. As to the number of distinct drawings he is to make, he is always his own judge, and he is paid, as the lawyer, not for the amount of paper and ink used in working up his case, but for his experience and knowledge of his work, the difference being that for the lawyer there is no established rate of charges, whilst the architect is governed (or should be) by the scale of commissions recorded

by the Institutes on both sides of the Atlantic. In general practice to require the builder to return the drawings and specifications to the architect's office, previous to the final payment, is part of the contract; and disputes seldom, if ever, occur as to their ownership at this juncture, the client being in haste to occupy or acquire possession of his improvements, and consequently indifferent as to the disposal of the drawings. The difficulty which many architects have to contend with arises when the client gets to the point where he decides to postpone the construction of his building. All the necessary labor on the architect's part has been expended to make a complete set of drawings, which appear to the owner of the proposed improvement the tangible exponent of that labor, and therefore the only legitimate "money's worth," so far as he is concerned, which he can lay hands on. It is at this time, generally, that he is confronted with rules of the Institute. He very naturally claims ignorance as to the proceedings of any such (to him) close corporation, and scorns to be governed by what he considers one-sided laws. Furthermore, "what is usual in such cases is nothing to him, and, since he is not going to build immediately, he will pay for his (?) plans, and take them home." Until the Institute, or the profession aside from the Institute, has educated the building public to a greater knowledge of its rules and usages, there will be the liability to discuss this vexed question. Many architects, prone to leave this matter for settlement when it shall present itself, shun thrusting the necessary information into the client's face at the beginning of their business intercourse, fearing to jar his too sensitive nature, and drive him to the office of a less scrupulous practitioner, who will secure him, regardless of rules and by-laws. The greater proportion of our clients are building their first house, and are very reasonably in the dark as to anything in the premises except that they are to employ an architect who shall see that their wants are supplied. If the architect cares to have smooth sailing from first to last, he will instruct his "owner" in the rules of his office while he is stating to him his terms. The least he can do, is to post in a conspicuous place such circulars of the Institute as pertain to architect and client, in large clear type, with a heading that shall show them to be not only the action of an organized society, but the binding rules of the office in which they are posted. Casually calling attention to these, and, if necessary, discussing their merits before any work is done, is far better than running the risk of making an enemy by allowing your client to remain ignorant till the time when he comes to demand what he very naturally considers only his Quid pro quo.

BOARD OF CONSULTING ARCHITECTS AND ENGINEERS FOR PUBLIC WORKS IN INDIANA.

Indianapolis, Ind.

To the Editor of the American Architect:

Dear Sir: A bill is being prepared by some of the architects of Indianapolis, to be presented at the next session of the Indiana legislature, which will provide for a commission of architects and engineers, whose duties will be to examine all drawings and specifications submitted for public works, and to prepare an exhaustive description of each set of drawings; setting forth the merits and demerits of each, so as to enable those having charge of public works to form intelligent conclusions. It is the intention that the gentlemen composing the commission shall be those who stand eminent in their profession, whose integrity and ability will not be questioned. It is hoped by this commission to prevent some of the evils of competitions and virtually exclude pretentious practitioners. Each design having to pass a rigid examination will prevent such from entering the contest, and will give men of ability who enter competition some assurance that merit will be recognized and rewarded.

J. H. Stem.

NOTES AND CLIPPINGS.

We wish to draw attention to the publishers' advertisement on page vi. of the advertising pages, where it is stated that the numbers of this journal for November and December, 1878, will be given, gratis, to new subscribers who pay their subscription for the ensuing year before December 15, 1878.

Accident. — On Tuesday, November 26, while two bricklayers were at work on the second floor of the dome of the Capitol at Hartford, a hod-carrier as he mushouldered his load dropped the handle of his hod on the key row of one of the small brick vaults, and as the mortar was still green the brickwork gave way, and the three men were thrown to the floor, all badly hurt.

The Weather-Cock on Notre Dame. — It is said that Notre Dame de Paris has lost an ornament which was, perhaps, her most conspicuous one. Three or four weeks ago high winds swept over Paris, and one of the strongest gusts blew away from the spire of the church the gilded weather-cock which surmounted it. The dethroned bird is nowhere to be found. Whether he plunged headlong into the river, or was picked up from the pavement by some unpatriotic and sacrilegious pedestrian, man knoweth not. Within the outer frame of that bird was concealed a heap of minted metal. The collection included every French piece of money current in France, whether of copper, silver, or gold, from a centime to a hundred-franc piece. There were in addition coins of one denomination or another bearing the faces of all the sovereigns of Europe.

Poisonous Paints and Wall-Papers. — Dr. H. C. Bartlett, in a paper read at the Cheltenham (Eng.) Congress of the Social Science Association, said: Until the autumn of last year, I was unable to form any accurate idea of the frequency of cases of severe illness occasioned by poisonous paints and wall-papers. I had, it is true, within my own professional experience, known of several fearful outbreaks of lead-poisoning among the work-people employed in white-lead works, and among painters and others working in an atmosphere heavily laden with the saturnine vapors given off in the process of applying such paint or during its drying. I had also been consulted in a great many instances respecting wall-papers which were suspected of being colored with arsenic, in consequence of illness of the type recognized as arising from these sources. But, when I was requested by Mr. Jabez Hogg, the well-known surgeon and microscopist, to furnish some particulars of the more striking cases I had investigated, to be laid before Government, I was astonished to find that during the last eleven years I have traced back no less than one hundred and twenty-three cases of illness attributable either to the diffusion of carbonate of lead (common white paint) or to arsenical or antimonial coloring matters in paint or on wall-papers. Others have been working in the same field of observation, and of those who have witnessed the danger of permitting the use of poisonous pigments and wall-papers, I could mention the testimony of eminent medical men, analytical chemists, and others who have recently protested against the employment of such deleterious substances.

Ravenese Mosaics at Berlin. — A valuable discovery has just been made in the cellars of the Berlin Museum. Packed in various chests were found some old mosaics which had been bought in Italy during the reign of Frederick William IV. They date from the sixth century, are in the Byzantine style, and originally decorated the eastern apse of the now ruined church of San Michele, in Ravenna, a church contemporary with San Vitale. One of the mosaics represents a concert of angels, all playing on different instruments; another shows a frieze ornament set with garlands of laurel, on which doves sway to and fro. These mosaics arrived in Berlin just at the first outbreak of the March Revolution, and were stowed away in the cellars and forgotten. They are now being restored by Signor Radini, one of the assistants of the well-known mosaicist, Dr. Salviati, and are destined ultimately to decorate the crypt of the Imperial Mausoleum.

Making a First-class Lighthouse from an Inferior Light. — There is a lighthouse near the Isle of Skye which stands in a peculiar situation. Just before it is the width of a narrow channel; to the left the channel stretches away for a short distance; on the right, it extends indefinitely. A lantern sufficient for the short distances would avail nothing at the longer ones, while such a light as would be seen at the longer range would be needlessly and wastefully bright for the shorter ones. Recourse has therefore been had to a lantern which unaided will light the narrow channel, while two series of prisms concentrate and deflect a beam equal to a first-class light over the longer distances. The saving is from £400 to £500 a year.

New Architectural Monographs. — The Parisian publishing firm, Veuve A. Morel & Cie., have announced the immediate publication in ten or twelve parts of a superbly illustrated monograph, "Le Vatican et la Basilique de Saint Pierre de Rome." The greater part of the work was done by the late M. Paul Letarouilly, whose "Edifices de Rome moderne" is well known, and has been edited and completed by M. Alphonse Simil. Each part will contain twenty-two engravings and two chromo-lithographs which will make a total of about two hundred and fifty engravings, and twenty-five chromo-lithographs. Those who know the splendor of the illustrations usually issued by this publishing house will need no other assurance of the value of this new and most complete work.

Architectural Photographs. — The Arundel Society is now ready to supply the whole series of photographs, the "Sepulchral Monuments in Italy," which were made by Mr. Stephen Thompson. The series is made up of forty-nine large photographs and can be obtained in parts containing seven each. They will be issued shortly in chronological order, with descriptions and histories written by Mr. Thompson himself, and introduced by a preface by Mr. G. E. Street, R. A. Mr. Thompson is at present engaged in photographing the architectural remains to be found on the Island of Cyprus.

New Exploration of Assyria. — Mr. Hormuzd Rassam, who was a companion of Sir Austen Layard's earliest discoveries in the Euphrates and Tigris Valleys, has succeeded in obtaining from the Porte a most extensive firman for the exploration of the whole of Mesopotamia, Assyrian and Babylonian. Mr. Rassam will resume his explorations in the Nineveh districts, at Koyunjik, in the palaces of Sardanapalus, Sennacherib, and Esarhaddon, and at Nimroud. The excavations in the mound of Nebby-Yunus, close by Koyunjik, if carried out, may lead to the discovery of some accounts, however meagre, of Sennacherib's second campaign against Hezekiah, from the Assyrian point of view, as this is the site of that king's later palace. In Babylonia, Mr. Rassam will make it a special point to discover the site of the royal record office, which has been kept secret by the Arab and Jewish dealers, through whom we have obtained so many of the tablets, representing every branch of commercial and fiscal transaction found therein, and now in the British Museum. The mounds of Tel Ibrahim, the site of the city of Kutha, the great sacred university of Babylon, whence Assurbanipal obtained the originals of the cuneiform tablets, are also within the scope of the new firman. Mr. Rassam has also obtained a special firman for the exploration of Northeastern Syria, and Carchemish, on the Euphrates, the capital of the ancient Hittite Kingdom. This is altogether new ground. — *The Spectator.*

The Via Sacra. — The Via Sacra of ancient Rome has been entirely uncovered from the Arch of Titus to the Temple of Romulus. Several structures have come to light, some of which are of the old Roman period, and some of the mediæval epoch, but all of intense interest to historians and archæologists; and besides these, there are fragments of architecture and marble decorations, which will be studied by antiquarians. Three of these are dated 339, 341, and 356.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, DECEMBER 14, 1878.

CONTENTS.

SUMMARY: —
The Supervising Architect. — President Barry's Address to the Royal Institute of British Architects. — Opinions of the English Press. — The Erratic Course of Architecture in England. — Architects' Superintendence. — Mr. Whistler's Suit. — Mr. Lee and the Metropolitan Board of Works 193
THE LEGAL RESPONSIBILITIES OF ARCHITECTS. II. 194
THE ILLUSTRATIONS: —
The *Gazette* Building, Cincinnati, O. — St. Lambert's Church, Münster, Westphalia. — Curio Case. — Cottages 195
CORRESPONDENCE: —
Letter from Albany. — Letter from Paris 196
COMMUNICATIONS: —
Taxation without Representation, I., II., III. 199
THE NOMENCLATURE OF MR. WHISTLER'S PICTURES 199
THE RETORT COURTEOUS 199
NOTES AND CLIPPINGS 200

AFTER many conflicting reports of what would and what would not be done, and apparently after considerable conflict of opinion among authorities, Mr. Hill has been suspended from his office of Supervising Architect, until the end of his trial under the Chicago indictments. Mr. John Frazier, Superintendent of the new building for the Bureau of Engraving and Printing, has been assigned as acting supervising architect *pro tem.* The suspension, which is somewhat unexpected, was made by the President's express order, the Secretary of the Treasury having, it is said, desired that Mr. Hill should be maintained in his position except during his actual trial. Of the propriety of this suspension it is not our province to judge; the question whether a public officer under actual indictment should be maintained in position is a general question of administration, the discussion of which belongs to politics. We may be allowed to say, however, considering the visible tendency to discuss the question on a wrong basis, that it is a question simply of a general public policy with which no opinion of the guilt or innocence of a particular officer ought to have anything to do. The rule ought to be universal, in one way or the other. For any public officer, be he collector, secretary, or president, to be influenced in his official action in a particular case by his belief in the justice or injustice of the prosecution, would be a prejudgment of the action of the courts, and therefore a grave offence against official propriety. Collector Smith has written a letter to the New York *Herald*, in which he says that he has had nothing to do with the prosecution, not having appeared at all before the jury, before whom the matter was brought by the Judiciary Department, in consequence of his report to the Secretary of the Treasury, last spring. He also says that he has no candidate for Mr. Hill's place, and has never asked the President to appoint anybody to office.

AT the first ordinary meeting of the Royal Institute of British Architects for 1878–79, the president, Mr. Charles Barry, delivered an opening address which has many points of general interest. The view presented of the present condition of the British Institute, while by contrast it awakens a feeling of mortification at the shortcomings of our younger society, is certainly instructive, — as an indication of the results possible to organization and effort. The membership has, during the past year, increased from 615 to 645 in active practice, — an unprecedented increment; of these 290 are members not living in or near London. In addition there are 95 honorary fellows and associates. The invested capital of the Institute is $27,500, and its income for the last year, $12,000. Its library, exclusive of periodicals, contains 5,500 volumes, which have been used by 596 readers during the twelvemonth, about equally divided between day and evening. In all these details the president shows that the increase has of late been unusually large. With regard to the Egyptian Obelisk, now at last erected upon the Thames embankment, he takes occasion to express the feeling of regret felt by every Englishman of artistic perceptions at its extremely inadequate and unfortunate position, buried among lofty buildings, and having no relation with any important axis, — a feeling with which Mr. Leighton, the new president of the Royal Academy, and an honorary member of the Institute of Architects, expressed the heartiest sympathy in his speech on the same occasion, seconding a vote of thanks to Mr. Barry. He also, as representing the guild of painters and sculptors, in referring to Mr. Barry's exceptions to architectural competitions, expressed his doubts whether the "survival of the fittest" usually resulted from this method of selecting professional assistance. In respect to archæology, President Barry asserted that the late discovery of the Greek city Sipontum, in Apulia, buried whole in a volcanic earthquake, had given to the world a new Pompeii, from which results of the most extraordinary importance may be anticipated. He then proceeded to make a few remarks upon sessional papers, suggesting that in these, and in the discussions which followed them, it would be well in the future to have somewhat less of æsthetics and somewhat more of practical matters, such as ventilation, warming, lighting, etc., and closed with an expression of congratulation at the change, from torpidity to activity, from repose to earnest endeavor, which had of late characterized the proceedings of the Institute.

THE ARCHITECT takes rather vigorous exception to much of this address, claiming, with some interesting historical allusions, that the alleged change from torpidity to activity is more in appearance than in result, and that the proposition involves an unjust censure upon previous administrations, and more especially upon those in which Professor Donaldson, the founder of the Institute, had borne a conspicuous part. The *Architect* questions the significance of the increased membership, the increased library, the increased income, etc., and maintains, with reference to Mr. Barry's proposition to substitute for competitions of designs competitions of *names*, that this ascendancy of "names" is really the very thing that competitions of designs have been struggling to overcome ever since the great fifteenth century. The *Building News* also maintains that the grievances of the profession with respect to competitions are by no means to be corrected by a resort to President Barry's substitute, which would deprive the profession of the obvious advantage of a system which protects and encourages its junior members, and which, if properly used, would justify the theory that the domain of art is a republic and not an aristocracy. The *Building News* further states its opinion that competitions of designs have failed to realize this just expectation of their proper functions in the practice of architecture mainly through the failure of the Institute to issue conditions binding upon all its members to enter upon no competition which is not based upon principles which shall secure alike to the profession and to the public the best results of honest emulation. As for the character of the sessional papers, this authority avers that of the dozen or more promised in the programme of the Institute for the ensuing session only four are likely to have any real value to the profession, viz.: those on "Bills of Quantities and their Relation to Contracts," "Lighting by Electricity," "The Modern Restaurants," and "Improvements in Glasgow and the City Improvement Act."

THE comments of the London *Times*, as reflecting the impression made upon the public mind by the statements of the official head of the architectural profession, are significant. In the presence of the unprecedented architectural activity of the age, it discovers that any general agreement on questions of taste is absolutely impossible, but takes comfort in Mr. Barry's cheerful address, and in the assertions that modern English architecture can hold its own with that of any other nation. But the visions of the past which are repeated in modern work, following apparently no general plan, in accordance with no convictions of principle, conflicting one with another on essential points, and all denying the ideas in vogue a few years ago, are a constant puzzle to the layman. The *Times* says: "It may be true that we shall be more distinguished hereafter by the unwearied energy of our aspirations than by our successes in fulfilling them;" that we "scoured the history of architecture to find something that we might at least copy, and repeat with some sense of satisfaction, and that we never discovered anything with which we could be content." It is strange, perhaps, that the intelligent layman, viewing the results of architecture from the outside and uninfluenced by the prejudices current in the profession, does not discover that these successive English fashions of archæological revival must necessarily distract the professional mind from essential principles, out of which a true

and comprehensive system of architectural development may arise, and must fritter away its force upon the mere accidents and accessories of design. Thus, while under the dominion of the Stuart dynasty of architecture, the English professional mind seems capable of finding no virtue in that of the Edwards, and is for the moment alienated even from the perfecting of Greek forms or from the refinements of the Italian Renaissance. Why the vigilant lay observers do not recall the well organized Areopagus of Conduit Street to a sense of its responsibility as the guardian of principles and not the leader of fashions, why they do not point to the consistent results of four centuries of academical discipline on the other side of the Channel, and demand from the English architects an art consistent with Anglo-Saxon civilization, is not easy to explain. But the critics may yet be inspired to ask some questions which the great practitioners of London and the President of the Royal Institute may find it difficult to answer.

One or two points bearing on the subject of our last week's editorial — Architects' Risks — were lately brought out in the expert testimony given in a case now pending before a South Carolina court, which involves the question of payment for extraordinary services on the part of the person who performed the duties of an architect. To the question what kind of superintendence, and how much time, an architect gives in the usual practice of the profession to the work he oversees, the answer given was the natural one: that the number and duration of his visits was discretionary, being in his judgment sufficient to insure that the work was done as directed by the plans and specification. The question was then asked whether, in case a house was built by the day, and the architect, being a mechanic, supervised the purchase of materials, directed and instructed the workmen, and followed the work into all its details, spending a large part of every day upon it, he should be entitled to extra compensation, and what that compensation should be. The answer given was that the usual five per cent commission does not cover such services, which with "many other details requisite for securing proper materials and workmanship" are ordinarily performed by a "general foreman" or a "clerk of the works" at the cost of the owner of the building, and that if they were rendered by the architect, he was entitled to an additional five per cent, making a whole commission of ten per cent. Assuming it to have been superfluous to say that such special services are not architectural services at all, and that an architect had better not undertake to render them, these answers give pretty clearly the simplest statement of the actual practice, and of what is reasonable in such a case. No architect in successful practice, and even no well-to-do contractor, would perform such services, except by proxy, or could afford to, for even the five per cent additional fee, unless in work of exceptional importance. Yet nothing less than this would do, if the plenary responsibility for which many people look were held to attach to the superintendence that entitles the architect to his modest allowance of one and a half per cent out of the established fee.

Mr. Whistler's suit against Mr. Ruskin, although it has its amusing side, which is the first that presents itself, has also its serious and instructive side. There could hardly be a better example of the folly of appealing to a popular tribunal to decide an artistic quarrel, for this is what the quarrel really was, Mr. Whistler being, it is safe to say, more concerned about the affront to his standing as a painter than about the thousand pounds' damages for which he brought suit. Mr. Ruskin and Mr. Whistler are both artists whose ideas, diametrically opposed to each other, are *caviare* to the general, with the difference that Mr. Ruskin labors earnestly to make his intelligible to the public, and at least succeeds in attracting much of their admiration; while Mr. Whistler, we fancy, hugs himself in the possession of an esoteric quality to be manifested only in a narrow circle. Mr. Ruskin, exasperated at Mr. Whistler's wilful neglect of the things which are to him most precious in painting, and not being much in the habit of controlling his pen, accused Mr. Whistler, in a passage in the *Fors Clavigera* which has been often quoted, of an ill-educated conceit approaching the aspect of wilful imposture, and added the not very delicate or gentlemanlike fling, "I have seen and heard much of cockney impudence before now, but never expected to hear a coxcomb ask two hundred guineas for flinging a pot of paint in the public's face." Mr. Whistler was injudicious enough to bring into court, not only his quarrel and his reputation, but his pictures, and the British jury, which naturally had no eye for harmonies in amber and black, or nocturnes in blue and gold, had a keen sense of the captivating vigor of Mr. Ruskin's language and of the analogous witticism of the opposing counsel, inquiring of Mr. Whistler which was the bridge in his picture and which was the pier. The disinterested testimony of a painter of the opposite school, Mr. Burne Jones, that Mr. Whistler's work was masterly in its way and especially in color, though only a sketch, and not to be considered a picture, appears not to have influenced the jury greatly, especially in face of the acknowledgment of the artist that such a nocturne was easily painted in a day or two, and that two hundred guineas was perhaps a "stiffish" price for it. The jury did doubtless the very best thing they could have done when they decided to leave the question exactly where they found it, by awarding a farthing damages without costs. It is not very likely that Mr. Whistler's paintings will have lost any old admirers or gained any new ones from the trial, and the artistic quarrel remains as it was before, while the unsympathetic public is entertained by seeing the two protagonists, whose qualities it ought to honor, displayed before it, with no knightly wounds, but with clothes torn and plumes draggled in a scuffle.

We mentioned some time ago (*American Architect*, April 6, 1878) the attempt of the Metropolitan Board of Works to make a London rector pay for the repair of his own church. Part of one of the pinnacles of the old church of All Saints, in Lambeth, fell down; and since the parish, a poor one, did not find money to repair it, the Board of Works, pronouncing the spire dangerous, itself restored it, and taking a cue from the law which allows it to repair a dilapidated building at the cost of its owner, called upon the incumbent, Mr. Lee, to pay the bills, on the ground that he was constructively the owner of the church. The rector naturally refused to pay, and the Board applied to a magistrate for a distress-warrant against his property, which was refused. The question has been carried from one tribunal to another, the Board always getting worsted, but renewing the attack till the case reached the Queen's Bench. The indomitable rector pleaded his own case, arguing that he was not owner of the church, since he could neither destroy nor sell it; and that the Board had recognized the exceptional character of the building, since it had not attempted to force a sale of it. The Lord Chief Justice accepted Mr. Lee's argument, and decided that a rector could neither be required to repair his church at his own expense, nor obliged to beg money for the purpose. Fortunately for the clergy in the United States, they are exposed to no such embarrassments, since all the churches are the property either of private corporations or of individual laymen (unless it be in the Roman Catholic Church, where, we believe, the bishops are the legal owners of the church-buildings). But the clergy of the English Church will doubtless be thankful to have been represented by a rector who could so valiantly hold his own against the aggressive and uncompromising Board of Works. In a country full of costly churches, which being mostly old can pretty easily fall into dilapidation, to compel the clergy to keep them in repair would be to saddle them with a burden which might well prevent a great many men, and those the best, from taking orders.

THE LEGAL RESPONSIBILITIES OF ARCHITECTS. II.

An illustration of the American practice is found in the case of Newman *vs.* Fowler, decided in New Jersey in 1874.

A house after completion proves defective; the report of the case does not say in what respect, but it is found that there was want of care and skill, on the part both of the architect and of the contractor. On the principle that when several persons are concerned in inflicting injury upon a man, any one of them is liable for the whole damage, and that the person wronged may choose which he will compel to pay the indemnity, the owner sued the architect for the entire damage. The jury was charged that where the negligence of the contractor was such as to be discoverable by the exercise of reasonable care and skill on the part of the architect, the architect and the builder were alike responsible; for the effects of negligence of the builder beyond this measure, he alone was responsible. In this case, the negligence or unskilfulness of the architect being admitted, his sameness of accountability with the builder was a necessary consequence, and the owner had a right, if he chose, to obtain from him the full damages, and judgment was given accordingly.

A point in this case is interesting. The owner had kept back a part of the contract price from the builder, on account of defects not

specially described. The defendant's counsel claimed that by so doing he had already obtained indemnity from the builder, and could not demand further damages from the architect. The judge's reply was that if the builder had sued the owner for the balance of the contract money, and the defence had been that it was retained on account of the same defects for which the present action was brought, and the defence had prevailed, it would have barred the present action against the architect, since the owner was not entitled to obtain damages twice over, — once from the contractor and again from the architect. But in fact the builder had not sued for his money, and there was no evidence that the owner might not have retained it on account of other defects than those for which he was suing the architect, so that the question of the retained balance was still open and undecided, and could not be considered in the present action.

Another case, decided in Missouri in 1876, gives an idea of the care which the law considers to be required of architects. A building was in process of construction, and iron columns and girders had been set to carry some portion of it. By defect probably of the foundation, two of the columns settled after the weight was brought upon them. The architect proposed to raise them with the girders resting on them, apparently so that they might be underpinned. It was in evidence that one of the contractors who furnished the iron-work, hearing the architect propose to apply jack-screws under the caps of the columns, advised him not to do so, as he did not think the casting strong enough; but the owners took the architect's view, and on his recommendation employed a professional building mover for the work. It appeared that there was some stipulation that this man should work under the direction of the architect; if it had not been for that the judge's opinion was that the architect would not have been liable for the improper management of the raising, which was alleged by some of the witnesses. On the application of the jack-screws the cap of one column broke at the corner, and the flange of the compound wrought iron girder resting on it bent, allowing the girder to fall, bringing down a wall with it, and killing a workman employed in the building, whose widow sued the architect for compensation for her loss. The architect himself was not in the building at the time, but knew and approved of the method adopted to effect the raising.

The judge charged the jury that if they found that the disaster was due to an improper method employed for effecting the raising, or because of inadequate supports for the screws or unskilful application of them to the columns, while the work was under control of the architect, he must be held to have shown negligence in business which he undertook, though he failed to show the care and skill which, having undertaken it, the law imposed upon him, and was liable for the damage resulting from his negligence.

Some of the testimony went to show that the design of the girder was bad, and that the columns were weak and badly cast, and the jury were charged also that if they found that defective iron-work was the origin of the accident, and that this was designed by the architect in an unskilful manner, or was defective by means of bad material or workmanship, which could have been discovered by the defendant, in this case also he was guilty of a negligence which rendered him liable for injury resulting from it. The judge thought that the absence of the architect at the time when so critical an operation was going on was in itself a failure to show the care required of him, and thought also that he was guilty of neglect in not having the strength of the caps of the columns tested before subjecting them to so severe a strain; and the jury taking a similar view, the defendant was obliged to pay the amount claimed, $5,000.

The court, in this case, was of opinion that the owners of the building were liable, together with the architect, but it is not very evident why; and in an English case of manslaughter from the falling of a building, the owner, who proved that he had given orders for good and substantial work, but knew nothing of construction himself, and had not controlled the details of the execution, was discharged.

The professional man must not forget that the damage for which he may render himself liable by remissness in duty extends beyond loss by deficiencies in the construction. A distinguished architect in London was accused of negligence in failing to prepare plans for a certain alteration with due rapidity, and the proprietor, who let the rooms in the building to lodgers, claimed the profits which he would have derived from his house if the work had been finished without delay, and the court decided that he was entitled to recover them.

It would seem, therefore, that there is no want of law to hold the architect to his duty to his employer; but if the courts set up a high standard of professional diligence and skill, it must be acknowledged that their requirements are on the whole reasonable and just to all the parties, and the practitioner, conscious of having done his work with faithfulness and skill, can appeal with confidence to a jury against the oppression of an ignorant or avaricious client. Every step that is made toward a clearer definition of our duties helps us to a recognition of our rights, and if the public should learn to hold us generally to a stricter accountability and a higher standard of skill, those who desire the advancement of the profession will rejoice, not only in the necessity for higher attainment, but in the increased respect and easier relations with the world, which recognized acquirement and responsibility will give.

But there are certain branches of an architect's duties towards others than his clients, which are by no means so well defined. An important case decided in the House of Lords after long and costly litigation raises a very interesting point. A contractor named Thorn was invited to estimate on plans and specifications for rebuilding the Blackfriars' Bridge. His bid was accepted, and a contract, of which the specification formed a part, was signed. The engineer had designed to construct the bridge piers by means of iron caissons, sunk in the river and filled with masonry, and the plans and specifications were drawn to that effect. In execution the caissons proved too weak to sustain the water pressure, with the force of the current, and the upper part had to be removed, and the work finished by the slow and costly process of building only when low tides permitted. When the bridge was finished the contractor sued the mayor and corporation for damages for the insufficiency of the plans and specifications, alleging that by offering them for estimates the corporation virtually guaranteed that the bridge could be built in accordance with them. The corporation replied that there was no guaranty, express or implied; that while they placed confidence in their engineer, Mr. James Cubitt, they did not pretend to warrant his work; that the contractors knew as much of him as the corporation did, and if they had wished, they could have had an engineer of their own examine the plans and pronounce as to their practicability, and if they had then wished to withdraw their proposal they might have done so; and the unanimous opinion of the judges was that this defence was a good one, and judgment was rendered for the corporation.

According to the Lord Chancellor, the same principle should apply in every case where a man employed an architect to prepare plans and specifications, and invited estimates upon them.

It being thus settled that the first party to a contract does not guarantee the plans and specifications which form a part of the contract, it is of the highest importance to determine whether the expert who drew them could be understood to have guaranteed them. In the case of the bridge the engineer was dead before the action was brought, unfortunately for his professional brethren, who could have derived much instruction from seeing the result of a suit brought against him; and there appears to be few or no recorded cases of the kind, unless in French practice.

Another subject which gives trouble to a conscientious architect is the proper adjustment of his duties between the builder and the owner. In case of dispute between the parties to the contract, he is made the judge by universal custom, and even in court the architect's position as umpire between owner and contractor is so well recognized that his testimony is generally the most important part of the evidence; yet how does such a position agree with the rule of law that a man can act only in behalf of one person at a time? The owner engages him, and bears alone the cost of his employment; is he not then solely the agent of his employer? and if so, how can he act as umpire between his principal and the opposing party?

That this is a serious question, every one in practice has occasion to know. Cases happen every day in which a contract open for estimates is awarded at a price which the architect, who has the other bids as well as his own judgment to guide him, knows to be less than the value of the work; is it his duty as agent of his employer to accept the proposal which he sees to have been based on some misunderstanding or error, and set himself to drawing up a contract so framed as to protect his principal from loss in case of the bankruptcy of the builder which he knows to be inevitable? Or has he a right to constrain his principal to accept a bid at a fair price, or to call the attention of the incautious bidder to the probability of an error in his estimate?

If he takes advantage of the ignorance or carelessness of the builder, to the benefit of his employer, has not the builder a ground of action against him? and if in pity for an honest mechanic who has made a mistake in adding up a column of figures, or who, not being very expert in reading manuscript, has been unable to spell out all the words in the specification, he has given him a hint of his misunderstanding, has not the owner, who is thereby obliged to pay a larger sum than with skilful management he otherwise would have needed to spend, a right to accuse him of unfaithfulness to his trust, and to claim damage from him?

Such questions have a serious bearing not only on the professional conduct, but on the peace of mind of a conscientious practitioner, and any discussion or citation of cases which have been decided that may tend to a general understanding and uniform practice in similar matters is one of the many things of which the profession is in great need.

THE ILLUSTRATIONS.

THE GAZETTE BUILDING, CINCINNATI, OHIO. MR. EDWIN ANDERSON, ARCHITECT, CINCINNATI, OHIO.

ST. LAMBERT'S CHURCH, MÜNSTER, WESTPHALIA.

We reproduce these views from the *Allgemeine Bauzeitung*.

CURIO CASE. DESIGNED BY MR. F. W. STICKNEY.

ENGLISH COTTAGE. MR. W. H. HAYES, ARCHITECT, ELMIRA, N. Y.

COTTAGE FOR DR. ERRICK PARMLY, OCEANIC, N. J. MR. R. R. ROSSITER, ARCHITECT, NEW YORK.

CORRESPONDENCE.

THE STATE CAPITOL AT ALBANY.

ALBANY, November.

I HAPPENED to be in the Assembly Chamber when the first attempt was made to show Mr. Hunt's pictures on the walls which they were designed to adorn. The attempt was itself a novelty, as are several other points in this scheme of mural decoration. The artist had already occupied some weeks on his sketches, the studies of single figures, and the colored cartoons. When the cartoons were at last completed they were photographed upon glass slides, and an oxyhydrogen light behind the camera threw them, magnified to their full size, into their true position. Two scaffoldings for the use of the painter had been erected, one at either side of the room over the upper of its two ranges of windows, and a bridge, some forty feet above the floor and fifteen below the ridge of the groined ceiling, connected them. From one end of this bridge the picture at the other could thus be seen, and judged in all but its color. The artist, with a movement, could shift the picture downwards or upwards, to the right or left, enlarge it or diminish it, at will: and when it was finally adjusted, could fix the outline on the wall from the photographic image with such variations as seemed needful on a view of the whole from across the room — a distance of eighty odd feet. As you already know, the pictures are painted directly on the stone. The space which each is to occupy is bounded by the line of the vault above and at the sides, and by the window heads below, and is some fifteen by forty-five feet in area. The subjects are allegories. That on the northern wall (the axis of the room is east and west) represents the Flight of Night. The Queen of Night is driving before the dawn, charioted on clouds drawn by three plunging horses, one white, one black, one red, without other visible restraint than that of a swarthy guide, who floats at the left of the picture and whose hand is lightly laid upon the head of the outermost horse. At the right of the goddess, and in deep shade, is the recumbent figure of a sleeping mother with a sleeping child upon her breast. The other picture is equally simple in composition. The Discoverer stands upright in a boat, dark against a sunset sky, Fortune erect behind him, trimming the sail with her lifted left hand while the right holds the tiller. The boat is rising to a sea, and is attended by Hope at the prow, with one arm resting on it and one pointing forward. Faith, whose face is buried in her arms and who is floating with the tide, and Science, unrolling a chart at the side. Of the effect of the pictures as mural decorations it is too soon to speak, but there is already matter for admiration in what may be seen of them in black and white; in the monumental largeness of the conception, the impressiveness of the individual figures, and the skill with which they are grouped, and, most of all, the repose which is preserved even in the tempestuous action which fills the Flight of Night. On the occasion of which I have written, when, after some experiments with single figures, this picture was thrown on the wall, three spontaneous cheers from the little group of people assembled on the scaffolding told of its effectiveness.

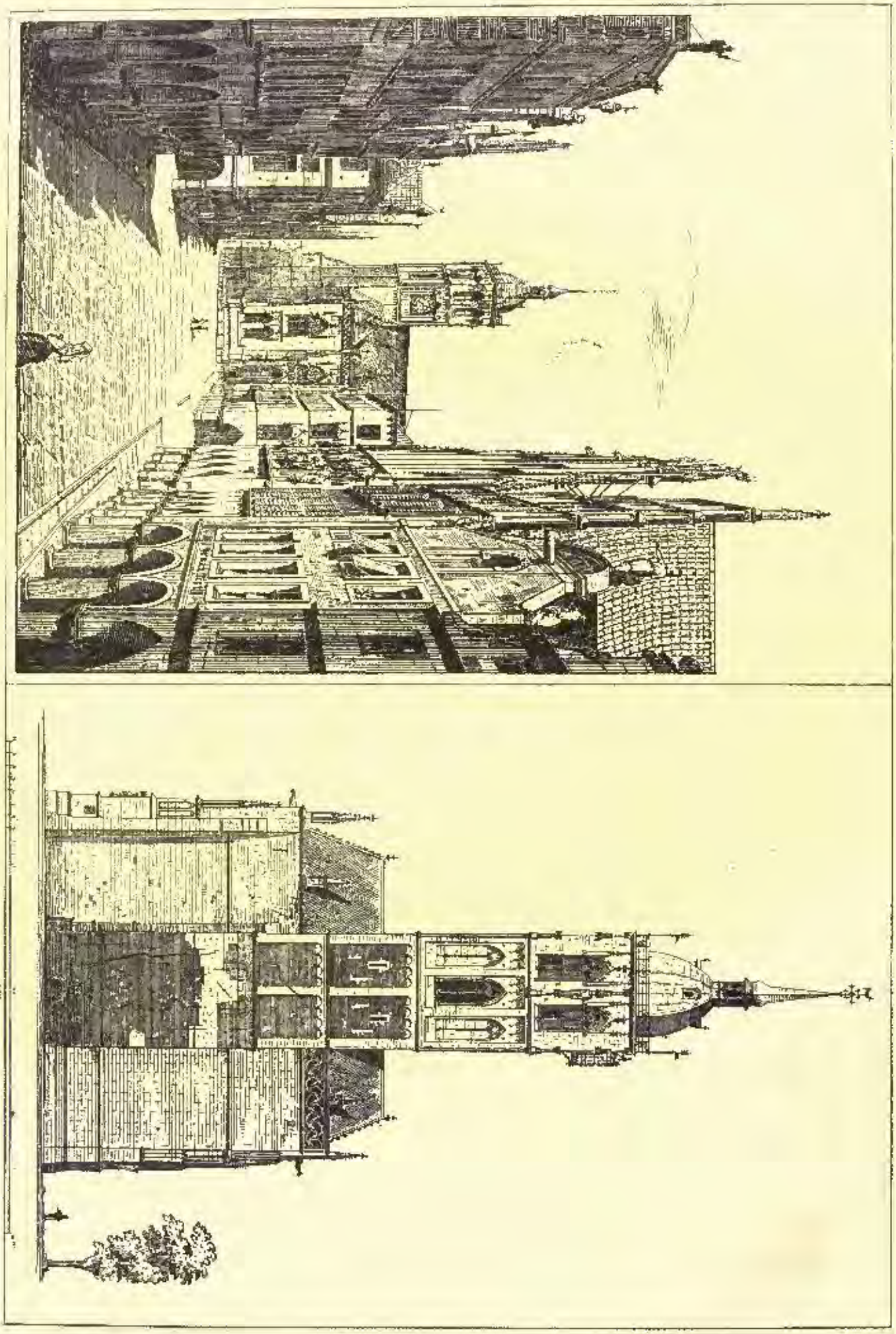
You may have a curiosity to know something of the chamber and the building which these pictures are to decorate; for, though the architecture of the Albany capitol has been hotly attacked and lorly defended since you published the modified designs in March, 1876, I do not remember to have seen any description of what has been done. One's first glimpse of the building from the river, or the river streets, is of a black roof of very steep pitch, with chimneys of gray granite emerging from it half-way up, and a range of granite dormers at the cornice line. From this point of view the mass recalls at once the château architecture of Francis I. Scarcely anything is to be seen as yet from below of the walls thus crowned, and on climbing the hill one finds that the finished work is the central pavilion of the north side with the curtain walls which connect it with the corner pavilions. These latter are very nearly as they were left two years ago. The portion which will be ready for occupation when the legislature meets in January is about three hundred by one hundred feet. The side elevation, published by you March 11, 1876, in connection with the original ground plan, published April 15, will give an idea of what is done, though it will give very little idea of how it is done. The massing of the building has been changed altogether from that shown by the sketch. The small, flanking towers rise only to just above the cornice line, where they are roofed with slabs of granite. The main roof rises in an unbroken pitch of sixty degrees to a height of eighty feet above the cornice, becoming thus the crowning and most conspicuous feature of the building. The grouping of the upper openings of the wall, seven over five, is maintained, as shown in the sketch, and the axial lines are disregarded. The modelling of the openings is also as shown, the law requiring a return to the first style not having been passed until the wall was built to the springing of the arches in the upper story. The columns are finished, however, with classic capitals. A light label moulding, with a leaf ornament, surmounts the upper windows, and the spandrels of the lower arches are decorated with classic detail. The cornice, which is of much greater height than the sketch shows, but not of great projection, has several rows of classic ornament, the most conspicuous detail being a couch. The dormers, three in number, aligned over the pilasters below, are high and narrow, composed each of an order enclosing the window and sustaining an entablature, which in turn carries a dwarf order with fluted pilasters, the pediment flanked and crowned by acroteria. The work below the upper story is very much as it was, except that the porch has not been built, and that the projecting keystones have been cut off from the whole building. On the court side the work is quite different from that on the street side, the statutory restriction not applying here. The nook shafts have very plain cushion capitals, the cornice, simply and emphatically moulded, is without other ornament, while the dormers are in every way different: they are richly treated, each is composed of two arches separated by a pier, the capital of which is to carry an eagle, and flanked by others which are to bear statues. The gables bear what I have seen described in your columns as "the coats of arms of the commissioners," but were meant to be the arms of colonial families. The three in place are of Stuyvesant, Livingston, and Schuyler. Mr. George W. Schuyler, the canal auditor, is a member of the capitol commission. There is no color on the outside of the building except the gray of the granite and the black of the slate. The modifications in the composition are all in the direction of breadth and simplicity. The great roof is perfectly unbroken, and there is a flank of plain wall at either side, and a belt of plain wall above the upper arcade. The thing which mainly strikes one in looking at the new work in connection with the old is, that the new work is a modelled wall, while the old is a wall with modelling applied to it. The curtain walls lack the upper story, in which the difference of treatment mainly appears, and have dormers similar to those of the pavilion, except that they are smaller and plainer, and are aligned over the openings.

The staircase, which is nearing completion, is in the well shown on Mr. Fuller's ground plan, to which it was committed. This well is at the southeast corner of the finished portion of the building, and abuts neither on the street nor on the court, but upon the lower stages of the tower. It receives no light, therefore, except from a large skylight at its summit. The well itself is some fifty by thirty feet. The staircase has two landings in each story. The stairs are built of a harder sandstone than that with which the walls are lined. The inner side of them is carried upon a wall, pierced in each flight with three arches which follow the slope of the stairs. From the upper and lower columns arches are turned to corbels, richly carved in foliage on the outer wall. This staircase rises from the basement to the gallery floor of the Assembly Chamber, and the wall is carried through the roof. There is some talk of filling the wall spaces thus obtained between the top of the stairs and the skylight with a picture in each of the four faces. The basement and ground floor are pretty much as they were left by Mr. Fuller, and need not detain us long. The most striking feature of the latter is the "entrance hall," which is not an entrance, some fifty by eighty feet, with two rows of square granite piers running the long way of it, connected by granite arches. The spaces between are ceiled with very flat brick arches, and the corner of each pier carries one very large round moulding. The next floor, the "entrance floor," of the plan, contains the Court of Appeals, to be used this winter as the Senate Chamber. A corridor, amply lighted from the court by seven windows and vaulted in plastered brick, extends one hundred and forty feet along the inner side of the central pavilion. A dado of tiles framed in sandstone skirts the corridor; the walls are decorated with gold and yellow on a ground of red, and the ceiling in blue, red, and amber, on a ground of gold. This decoration is now in progress, and it is proposed to enhance the effect of it by placing a box of growing plants in the recess of each window. The Court of Appeals, as shown on the plan, is nearly a square of sixty feet with a height of about twenty-five feet. Its shape and its apparent size have been much changed by the removal of the cast-iron columns shown in the plan, and the prolongation through the room of the line of a wall which divides it some twenty feet from and parallel to the corridor. The line is formed of granite columns bearing a marble wall. From the capitals of the columns rise the pairs of braces which support the great beams of the ceiling. This is very heavily panelled in oak, to the depth of some feet, and consists of three series of beams diminishing in size and richly moulded, while the panels are richly carved. The walls have a dado of tiles, while the wall-screen is wainscoted in oak, with a diaper carving in each panel. Above this, again, appears a belt of stone wall, as yet left quite plain. The subordinate rooms on this floor are meant for judges' rooms and minor offices ultimately, though the executive offices are temporarily lodged in them.

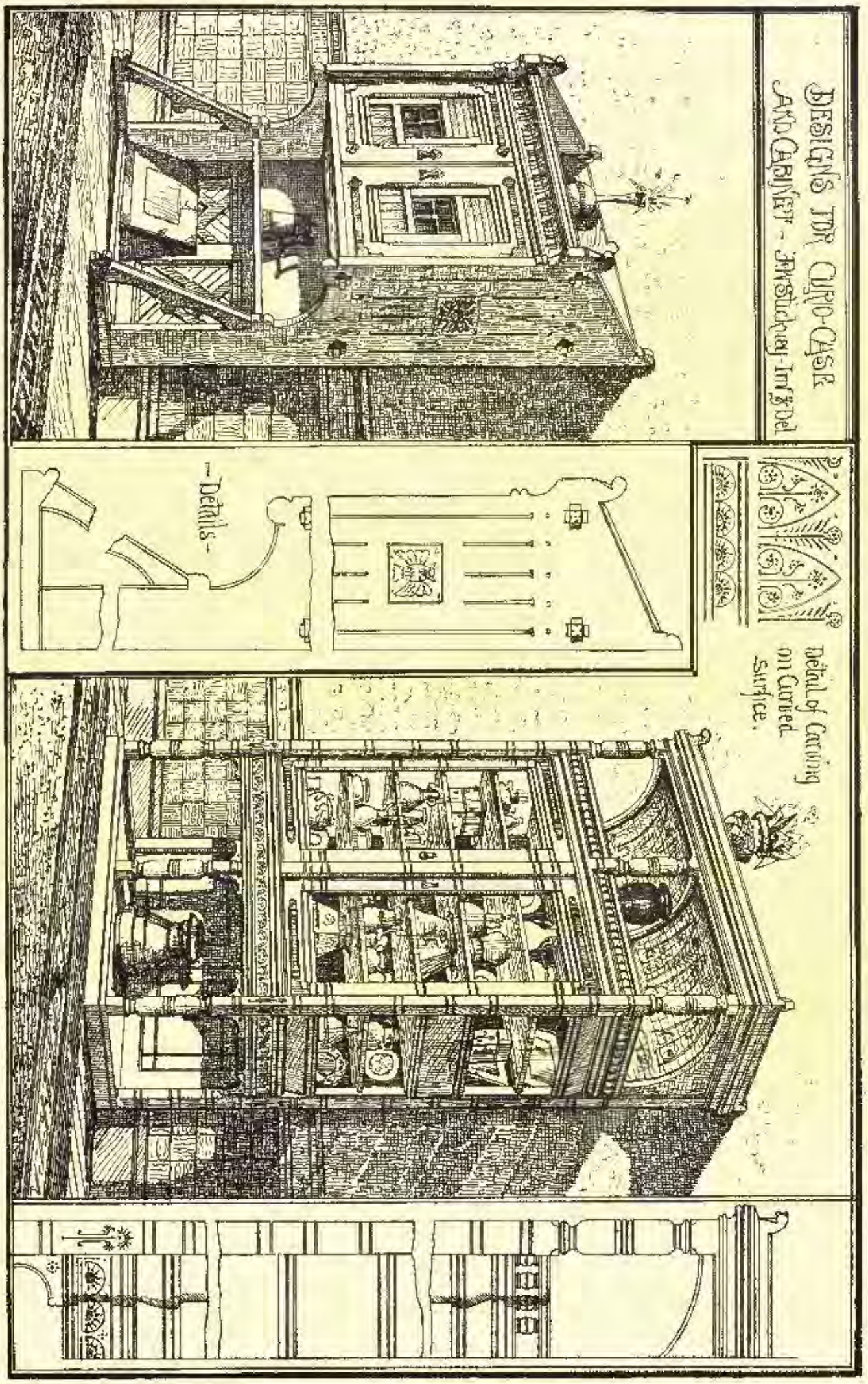
The next floor, some sixty feet from the ground, is the principal floor of the building, and the Assembly Chamber which occupies it may almost be said to be the building. The novelty of a vaulted room in this country is not its chief claim to study. The conception of the room, its treatment, which so evidently proceeds from the whole to the parts, and its decoration combine to make it the centre of the architectural interest of the building, and, to your correspondent, the most interesting architectural work in the country. I mean strictly to describe, but when one considers that this room is not an unhampered conception of a legislative hall, but has been conceived and executed under the hard limitation of adjusting such a conception to a predetermined box at the top of a building, it is not easy to suppress some enthusiasm. The ground plan of the room shows what these limitations were.

The extreme dimensions of the room are then one hundred and forty by eighty-four feet. The extreme length is shown, however, only

GAZETTE BUILDING CINCINNATI OHIO.



— ST. LAMBERT'S CHURCH · MÜNSTER · WESTPHALIA. —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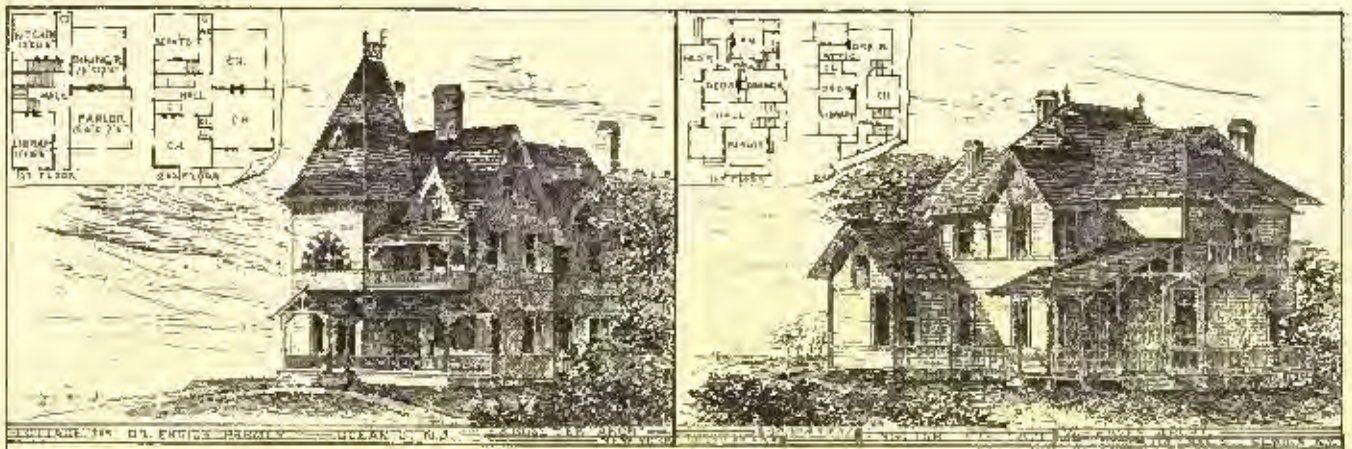
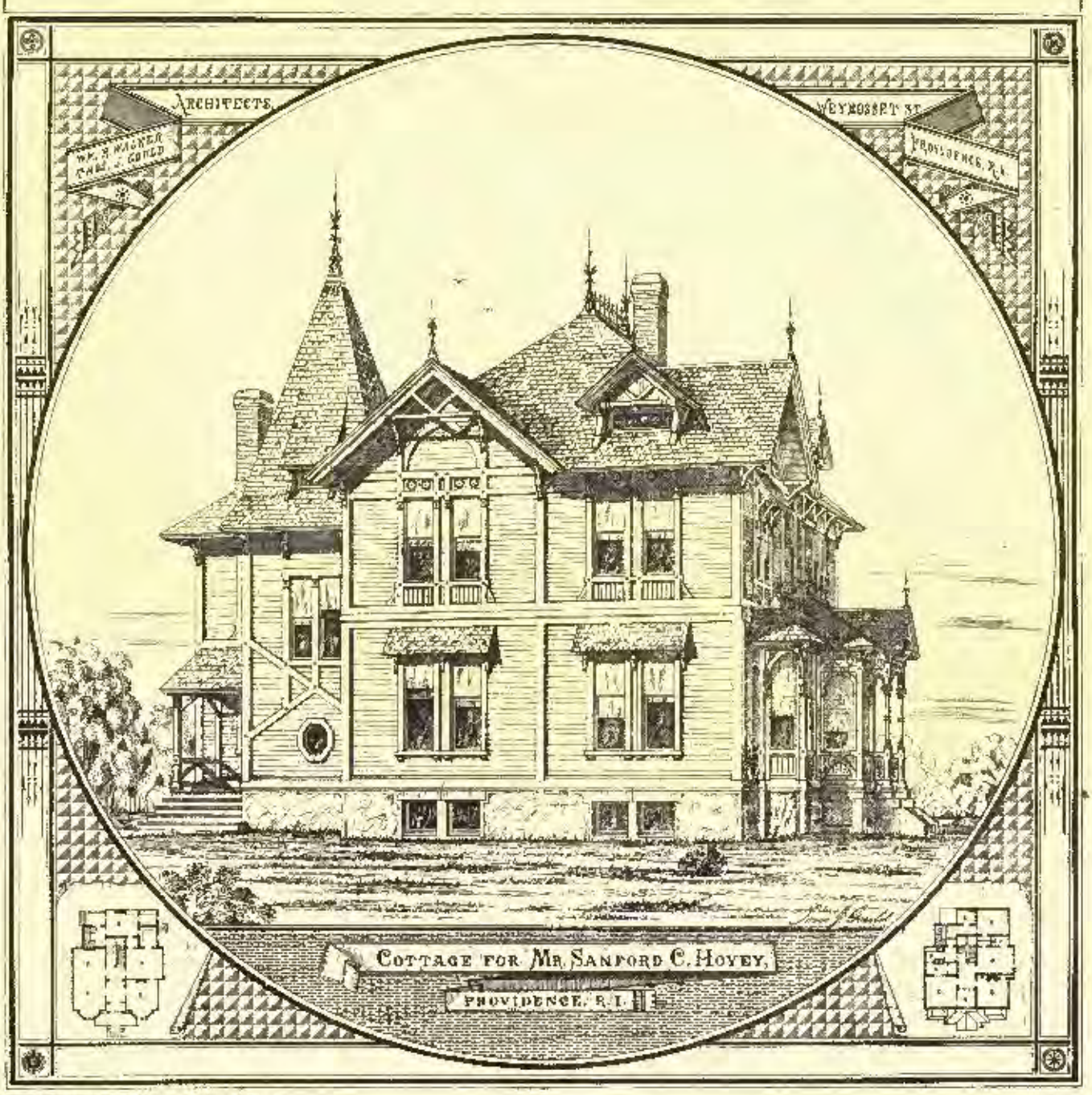
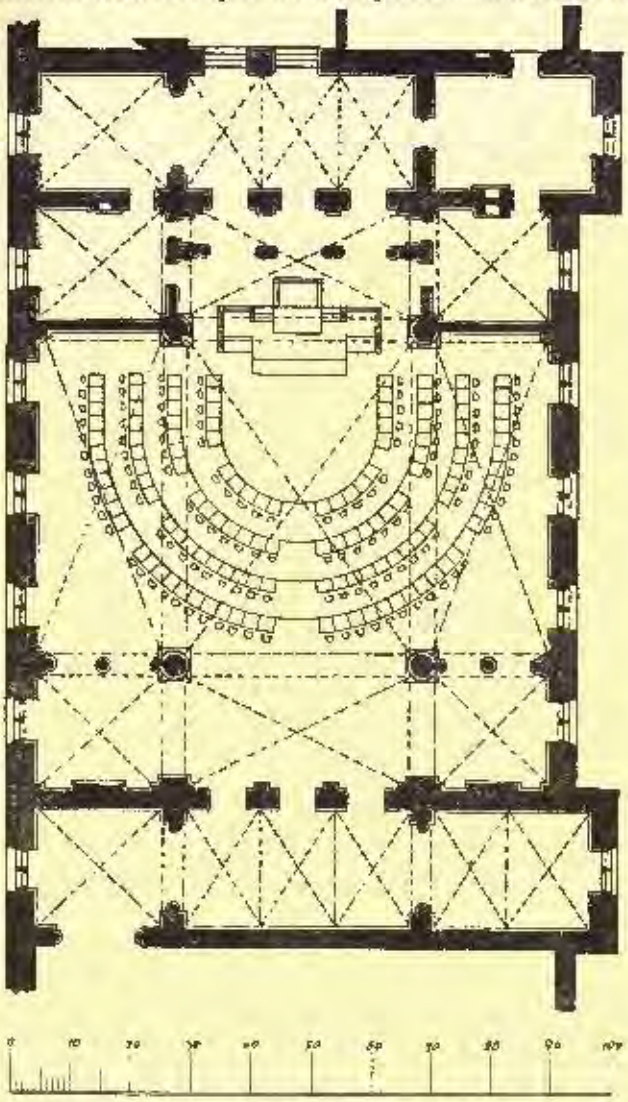



ARCHITECTS
WEYBOSSET ST
PROVIDENCE, R.I.
COTTAGE FOR MR. SANFORD C. HOVEY,
PROVIDENCE, R.I.

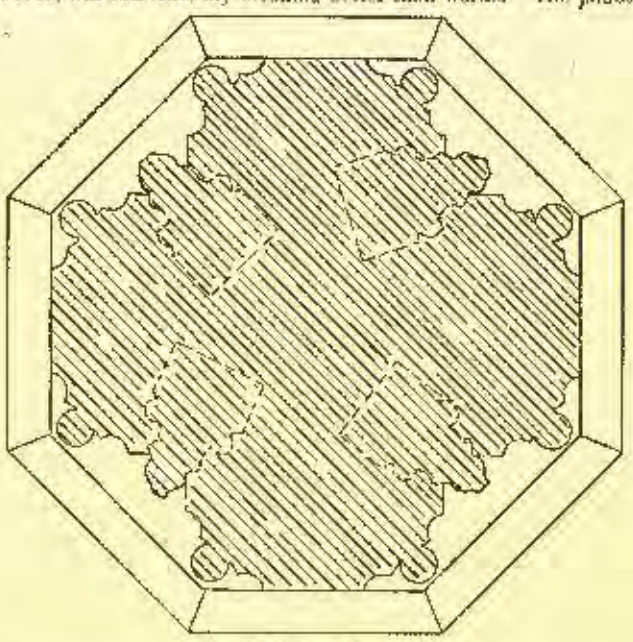
in the gallery floor and at the ends of the nave, if it may be so called. Each of these extreme spaces is a public gallery. The square spaces on each side of them are walled out of the room altogether. The spaces under them are vaulted lobbies, and it is the vaulting of the lobbies and not of the galleries, each of which is covered with a single vault, which is indicated on the plan. The squares at the corners of the central space are also separated from the main room



Assembly Chamber

on the first floor, at the speaker's end by a solid wall, and at the entrance end by columns carrying a stone screen, and each contains a gallery. It is scarcely necessary to point out how this disposition assists the perspective effect of the room, and gives it variety and movement. The Assembly Chamber proper is thus confined to the central transept, including the bays at either end, in one of which the speaker's desk is placed. The space bounded by the columns is forty-five by fifty-five feet, nearly, and the keystone of the vault over it, the highest point of the room, is fifty-six feet from the floor. The four abutting vaults are five feet lower at the apex. The ridges of the vaults are not horizontal, but have a rise of three or four feet at the centre. There are no ridge ribs and no *formerets*, the capping abutting directly upon the walls. The range of coupled columns behind the speaker's desk carries the wall which forms the front of the reporters' gallery, the floor of which, consisting of stone slabs, is carried by stone girders laid from this wall to the one behind. The reporters' gallery is thus in front of and lower than the public gallery, which occupies the extremity of the room.

The shafts of the four columns which support the central vault are four feet in diameter, each composed of three drums of red Connecticut granite, polished. The capitals and bases are of Westchester marble. The walls and the cells of the vaults are of Ohio sandstone, with ribs and arches of Dorchester-stone. The monk shafts of the windows are of brown Belleville-stone, with capitals and bases of Ohio-stone. All wall openings in the room, by the way, are round-arched. The hood moulds of the windows are of Belleville-stone, the *voussoirs* of Ohio-stone, the archivolts within them and the impost moulding of Dorchester-stone. The only wood in the room, besides the furniture, is in the floor and the doors. It will be seen that, even without pigment, there is already an effect of color attained, and that the constructive features of the room are distinguished by tint as well as by modelling. In the design of the room it is evident that two things have been kept mainly in view, one that the room is a civic apartment, though treated in forms traditionally associated with church architecture, the other that there is already, in parts performing functions, an inherent effect which it is quite possible to injure, and highly desirable to emphasize by the treatment of them. The architect has been less afraid of leaving his great constructive features rude than of frittering them away, of doing too little than too much, and this feeling has cooperated with the other of avoiding an ecclesiastical expression, and the wire-drawn attenuation of late Gothic, to produce the vigor and, so to say, the terseness of style in the Assembly Chamber. The annexed profile, however, will illustrate my meaning better than words. The jambs,



Section of Pier above Spring Line.

wall arches, and other features are of the same character as the vault. The mouldings are rather clear and emphatic than intricate.

The carved enrichment of the room is abundant, and incised arabesques are freely introduced as well as modelled carving. Of the latter, besides the capitals of piers and columns, of which there must be something like a hundred in all, and the hood moulds of the windows, are the very rich traceried railings which form the front of the six galleries the room contains, and become important in the general effect of it, the corbels which carry the reporters' gallery, and the detail of the chimney pieces which are yet to be put in. The spandrels of the arches immediately behind the speaker's desk are covered with carving in diaper, as are also the spandrels of the entrance arches. The soffits of the galleries at the entrance end are similarly treated. The springing course of the lower story carries an incised leaf ornament, as do the girders of the galleries, and each *voussoir* of the windows is covered with an incised pattern. The decorative detail is, throughout, highly conventionalized.

The color decoration is everywhere a part of the carved decoration. I recall but one piece of stencilled work, a narrow border along the ribs of the vault. The decoration of the vault is completed, but that of the walls which leads up to it and to the pictures, which are the crown of a system of decoration embracing the whole room, is not yet done. Each side of the transept, you will remember, has three windows below and five above. Between these two ranges is to be Mr. Ward's frieze, and above the upper, Mr. Hunt's picture. The wall is left plain up to the springing of the lower windows. The springing course has an arabesque ornament, as already said. The leaf is to be left in its own color, and the ground filled with vermilion. The cove of the brown stone hood-mould is to be filled with ultramarine, the ground of the *voussoir* with vermilion, and the edges of the ornament gilded. The wall above the springing line is to be decorated, each stone by itself, with an incised ornament, and the ground filled with a brown red. Over this comes the sculpture, over this the second range of windows, the wall plain as before to the springing line, and decorated as before above it, and over this the pictures. The decoration of the ceiling is also part of the system. The Ohio-stone, of which it is built, is of a mellow and yellowish gray tint. Each groin bears two belts of decoration, one almost at the ridge, the other not far from the springing, which follow the line of the courses. The ornament in the upper belt, fifty feet from the spectator, is very bold in design, and very boldly cut, the lower belt subordinate in all respects. The principal ornament is somewhat modelled, the inferior simply incised. The stone is excavated to a depth of some inches, and the ground filled, as before, with vermilion or ultramarine, the ornament edged with gold. It should be borne in mind that the ceiling has not the look of being decorated with horizontal bands, for the reason that it is not so decorated. Besides the concave curve of the vault, there is the rise of some feet between the apex and the ends, which determines the direction of the courses, and of the ornament they bear, and each course is also slightly concave in plan. On a dark day, the fact that the work is in relief can scarcely be perceived from the floor, but it is felt at once in the life

and movement which it gives the decoration, an advantage over simply stencilled painting, at least as great in effect as that which a fabric woven in colors has over one printed. The ribs and arches are left without color, though the ring of the central vault, a stone of three tons' weight, is decorated. The white marble capitals of the columns which carry this vault are to be painted in red, blue, and gold, the only colors used in the room. The carpet is to be red, with a border of positive colors, the furniture mahogany upholstered with red leather, and the window heads are to be filled with stained glass. S.

ENGLISH FURNITURE AT THE EXHIBITION.

Paris.

If the French lack the divine inspiration of Mahomet to journey to the refractory mountain, they take interest enough in it when it comes to them as a manifestation of their own influence: and we find this self-complacent nation keenly examining and fairly criticising the foreign departments at the Exhibition. First, in nearly all claims upon their curiosity, stands England, hitherto their great industrial rival, but now pressing upon them with vigorous efforts in decorative and applied art. The sections which interest them conspicuously are those of faience and furniture; and though in the former they find the closest commercial competition, from its having been more or less developed by French workmen and traditions, it has less novelty for them than the English furniture, which is purely indigenous. It is the entire novelty to them of the recent revival of the styles of "Queen Anne" and the Jacobean - - why not "King Jacob," to complete the travesty - - which renders their criticisms valuable to us, who have been too much in the current to judge impartially.

I think the first impression, among both artists and amateurs, was decidedly favorable at seeing such thoroughly developed styles, which from being historically unknown to them seemed highly original. Although they hardly understood many things, — such as seeing a massive buffet grotesquely cut up into pigeon-holes, — they were struck by the originality much as they would be by the odd details and terraces of an Indian temple. They were the more easily deceived, in that the æsthetic training of a Frenchman forbids mere caprice in design as contrary to the primary laws of art. To be *maniéré* is a fatal defect to them, and so when they discovered that the same whimsical features were repeated through nearly all the designs, and that the eccentricities were not those of a bold imagination, but stereotyped imitations of past styles, — so eclectic often as to lose their true spirit, — then the first enthusiasm was materially modified. The real beauty of the workmanship, however, lost nothing by examination, and an architect, who was at first most enthusiastic about this furniture, finally remarked to me, "Well, they are clever fellows, these English joiners, but it is a pity they have not better taste." This, I think, was the prevailing impression of those whose artistic training rendered them sensitive to crude caprices in design. Much of this capriciousness can be directly traced to Japanese influence, and it may seem strange that the French are as great admirers of this art as the English; but they are charmed by the exquisite grace and refinement of the designs themselves, rather than by the method of employing them, while it is the solidity of this latter phase which seems most to appeal to the English mind. There is no doubt, however, that, in spite of some severe criticisms, this display of furniture, which is most complete, has greatly raised the English prestige, and given new notions of use and comfort, not to the French alone, but to other nations who needed the hints still more. Continental bric-à-brac collectors have found undreamed of facilities for showing off their pet specimens by means of hanging shelves — almost unknown here — of varied designs; mantel shelves also, and étagères, with convenient apartments and side brackets, must have appealed to many "manias," though the prices were excessive.

So much from a French view; to us who are more familiar with the English fashions, the Exhibition is a very remarkable one, and shows great progress in the combination of "common-sense furniture" with grace and refinement of form. With Eastlake's crude forms and the heavy mouldings and panels of Talbert, an earnest spirit of refinement has been at work. There is evidence that the presence of ladies with their elegant toilettes is now taken into consideration; instead of the rude, masculine character of the designs a few years ago, a more feminine delicacy in mouldings and decoration appears. Rare and costly woods are brought to the highest polish, and then themselves often serve but as backgrounds for applied or inlaid ornament. The buffets are especially beautiful, and the best of them are sufficiently simple in outline to give full value to the finely worked details, which generally have the merit of being suitable to wood, and to the work of its characteristic tools, the lathe and the chisel. The skilful triumphs of the former have led to an abuse of colonnettes and other turned features, while the chisel is obtrusive in endless bevels and chamfers.

The medals were fairly awarded; the jury passing by the wildest "Queen Anne," but bravely facing some of the most characteristic Jacobean work, touched, possibly, by pity for the sad plight of this bastard cousin of their own honored Renaissance.

It was satisfactory to find that James Lamb, of Manchester, who was hardly noticed by the public, received a gold medal for the only two things he sent, a buffet and an étagère, which, though quite simple, were so full of dignified refinement that they merited more than far more pretentious displays. Collinson & Lock, also, received a gold medal for a large collection of furniture, in general admirable, and containing some of the most light and graceful pieces shown; such as work-tables, corner shelves, etc. For much the same style, Gregory & Co. took a bronze medal. W. H. Lascelles's set did not fulfil the promise suggested by the name of R. Norman Shaw, its designer, but it had some good qualities which justified a bronze medal. Messrs. Jackson & Graham were awarded the grand prize for their beautiful marquetry, which, though little practised in England, would rank with the best examples anywhere. A wonderful variety of exquisitely grained and tinted woods are most skilfully inlaid in delicate patterns, and their inlaid ivory is of the best. I suspect here, however, the skill is that of French and Italian workmen, and it is known that the finest inlaid cabinet was designed by a Frenchman. The rooms which were completely furnished naturally attracted the most attention. Of these, Collinson & Lock showed charming examples in Mr. Shaw's Queen Anne cottage, Rue des Nations. The entrance and staircase-hall are treated with a high dado of lacquered red, and this tint is carried, by stencilling, over the yellow bronze of the flock paper. The stairs, separated from the hall by a wooden arcade, are lighted by a stained window, which is picturesque without being out of place. Let us hope that the reaction from the silly "blue glass mania" will forever banish colored glass from living-rooms, from which, if the wondrous beauty of the sky is shut off by narrow space and lofty walls, there is the more surely need of the purest light. The dining-room has seventeenth century panelled dado and ceiling, and the robust though comfortable character is carried out by the stately side-board, and its projecting cupboard with small brass-set panes. The room complete was offered for £1,700. Delicate salmon and pale blue tints in the parlor are contrasted with red tiles in the mantel-piece; graceful rosewood furniture, and leaning sills to the projecting windows, make a pretty and cheerful room. A bedroom, with pink and blue cretonne draperies, completes a charming suite.

Messrs. Gillow & Co., in the pavilion for the Prince of Wales, show good taste and tact in avoiding all appearance of "show" rooms: a dining-room, with high olive-tinted dado, and above, harsh, bluish tapestries; on the left an octagonal library, the walls hung with large panels of faded olive-green velvet; a deep frieze of rich Japanese designs, on golden olive ground; the furniture of beautiful execution, but surcharged with colonnettes and bevels, and injured by futile effort to give a Japanese *cachet*. The fire-place is attractive with its brass flap, which may be raised in front of the grate to hold plates, or for a foot-rest, while on each side a bracket offers a brass disc for a cup, etc. But over all this broods a weary, shut-in feeling, because the large window is of stained glass. The walls of the Princess's bedroom are covered with muslin over a yellow ground, while lace, simply draped, forms a pretty frieze. In the Prince's bedroom, the good *bourgeois* gape at the "Gillow lavatory," which looks like a secretary, projecting only eight inches from the wall. Letting down horizontally, the panel reveals, fastened to the inside, a tin basin which is filled by a pipe from a small reservoir above. On shutting up this panel the water is emptied into a tank below. Room is found for a dressing-case, etc. The whole is so neat and compact that it looks like a Yankee invention. I was particularly curious to see what English style would be used for the drawing-room, but I found a stiff little Marie Antoinette boudoir, the walls covered with pale blue silk panels. Two nondescript chairs and two small stands formed the scanty furniture. It was an apology for a drawing-room, and with nothing English about it.

Here, then, the attention is forcibly drawn to the fact that, except the marquetry cabinets before mentioned, there is nothing in the whole exhibition suitable to be placed in a drawing-room or elegant boudoir, nor any drapery or upholstery which gives a clue how they should be treated. To be sure, Messrs. Trollope & Sons have fitted up a room panelled in cedar from floor to ceiling, and call it a boudoir, though it brings the irresistible conviction that it is really a hall, or anything which does not call for the delicate grace and feminine luxury in which a lady who has a boudoir is supposed to live. James Shoolbred & Co. also have a suite of rooms, dining-room, library, and bed-room, but no drawing-room furniture. It is not because the intention is to exhibit cheap furniture for the middle classes, as the scale of prices in this English section is princely. For instance, the small sitting-room of the Prince of Wales is for sale at £5,000, for which figure an exquisite French drawing-room may be had. The fact is, there is no attempt to treat one of the most necessary rooms in a fine house. Dining-rooms, halls, libraries, and modest bedrooms are shown, but nothing which can serve for elegant reception or drawing-rooms; no suggestion of luxurious divans or sumptuous chairs of state, no rich *portières*, or studies of draperies, and not even delicate ball-room chairs, — which, if not for every-day wear, have a specific use in a crowded ball-room, and are quite as serviceable as fragile tea or dinner sets of porcelain. There is hardly a piece exhibited which does not smack of slippers and dressing-gown. It may be jestingly noted that no other styles of furniture are needed in England, where balls and receptions are such notorious "crushes" that all furniture has to be removed, and where the dinners are so long, and the gentlemen remain so much longer after the ladies at table, that they join them only to take leave of the hosts, so that where no conversational "salon" exists, there is no need of the room which provides for it.

But, seriously speaking, the society of the "first court in Europe" must have drawing-rooms, and the fact that nothing for them is exhibited shows that their furniture is so entirely French that it could hardly be exhibited in the English department.

The English are much elated at their fine show of furniture, and they have reason to be, and to draw encouragement for the future, but — and it seems to be very generally overlooked — their exhibition can fairly be called only one of cabinet-making. The few brass hinges and wall-papers or hangings there are insignificant compared with the vast field of art which is opened by the study of *appliqué*, bronze-work, upholstery, and drapery. Of all beautiful effects possible in house decoration, the most purely artistic may probably be found in the use of draperies, where the pliant material obeys the lightest touch of the artist, and offers to him the possibilities which were turned into one of the highest glories of Greek sculpture, and at the same time gives him the splendor of mediæval color. I know the feeling is now current that draperies, as receptacles of dust, are not healthy; so much the worse for art, and so much the more room for ingenuity to come to its rescue. It must be remembered, too, that I am speaking about festal and not dwelling rooms. It is the fashion in England, and I fear we have caught the feeling, to think draperies and upholstery are not artistic. The leaders of house decoration in London at present eschew them as vulgar attributes of rich grocers. If they allow them to be so, they have themselves to blame. Divans of various forms, in which upholstery predominates, are as much a necessity for an elegant reception-room as a buffet is for a dining-room. Anything as luxurious as upholstery in our age of mingled refinement and comfort cannot be long "tabooed" by decrees of our art coterie, and the sooner the same attention is paid to it as is now given to cabinet-making, the better for the minds and bodies of all classes. R.

TAXATION WITHOUT REPRESENTATION.

December 4, 1878.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir, — I have received a bill for an assessment voted at the last convention of the Institute in New York. As this matter, though in itself small, interests many architects who have doubts whether the amount of the annual tax by the Institute could not be better spent in other ways, will not you or the Institute officers answer a few questions thus suggested: —

I. By joining our local chapters have we put ourselves in the hands of the annual Institute meeting to tax us who have no votes, as they see proper?

II. To put an excessive case, could the meeting, if it had so desired, have levied a tax of, say, $50 on each non-voting Associate to defray expenses, — possibly without increasing their own assessments?

III. Why cannot the American Institute of Architects accomplish all that is desirable by annual meetings, the slight expense of which might be borne by the members present, or by a slight tax on the chapters for postage and stationery?

For one, I am quite indifferent to the fact that the receipts were too little to defray the expenses of publishing the records, as your valuable journal gives us all of them that we want to preserve, and money is better invested, in my opinion, in other books than in such extra taxes. This especial tax is small, but the annual contribution from our chapter is large, and if spent, instead, at home on prizes, books, etc., would much help young men and interest their seniors. We most of us value highly the American Institute of Architects, but grudge the amounts it demands when other interesting matters come to our attention also. Perhaps you can put us in the way of the information we want.

Yours with respect,

AN ASSOCIATE

With a tax bill but no vote.

BOSTON, December 4, 1878.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Sir, — In view of the present prices of books of all sorts, are the reports of the American Institute of Architects worth eight dollars? The treasurer calls on us this morning for that sum, under a resolution passed at the late convention providing for "an assessment to defray the expenses of publishing the proceedings," etc. One who could not be at the convention should perhaps have nothing to say; but, seriously, when the matter is put in that way, it does seem as though we could make a much better use of the money, and that here is a chance for the reduction in expenses that has been so long asked for. W.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Sir, — I am in receipt this morning of a letter from the treasurer of the American Institute of Architects, in which I am told that over and above the regular assessment an additional one has been levied, to defray the expenses of publishing the Proceedings of the Eleventh and Twelfth Annual Conventions. I am an Associate of the Institute, and therefore have no vote at the annual conventions, and I do not see the justice of being called upon for these extras, concerning which I have no voice whatever. Why should not the Fellows vote that the Associates pay the whole assessment, as a punishment for not being Fellows? Least of all, it strikes me, should the Institute ask money for the purpose it does. I have always understood your paper to be the accredited organ of the Institute, and its proceedings to be promulgated through your columns, and if I had the power I should certainly vote against the unnecessary and, as it seems to me, useless expense of having them printed in a book form. It would seem that if the Institute was really desirous of increasing its membership it must work in some other way than by calling for assessments in addition to its already very large yearly one. ASSOCIATE.

THE NOMENCLATURE OF MR. WHISTLER'S PICTURES.

"WHY not?" said Mr. James Whistler lately to an admirer of his; "why should not I call my works symphonies, arrangements, harmonies, nocturnes, and so forth?"

Mainly, we should say, because these terms belong to music, instead of painting, which, Mr. Whistler loses no opportunity of insisting, should depend for its effects on itself alone, rejecting the aid of all the other arts, inasmuch that he refuses, if we may believe the above-mentioned admirer, to call one of his pictures Trottybeck, for the reason that, although the name would be fitly descriptive, "not even the genius of Dickens should be invoked to lend an adventitious aid to art of another kind from his." Nay, he goes so far, we learn from the same authority, as to call his own mother's portrait out of its name, exhibiting it as an "Arrangement in Gray and Black."

Now, what is the difference, we beg to ask, between invoking literature, as he deems it, by calling his picture Trottybeck, which he will not do, and invoking music, by calling one picture, as he does, a "Harmony in Gray and Gold," another an "Arrangement in Gray and Black," another still a "Symphony," and so on? There is a difference, doubtless, but it tells against the latter invocation, since giving a picture the real name of its subject, whatever the subject, is in fact not an appeal for adventitious aid, but simply a declaration of the subject, and therefore legitimate on any honest theory of art, Mr. Whistler's not excepted; whereas, giving a picture a figurative name taken from music is not merely an appeal for aid to a different art, but implies an attempt to produce effects analogous to those of one art by the materials and methods of another, a sort of imitation that deserves to be called jugglery rather than art.

The trouble with Mr. Whistler apparently is that, in spite of his round assertion of the independence of the several fine arts, he takes music to be the type of all of them, inferring hence that the ideal painter should deal with form and color as certain great composers have dealt with rythm and pitch, regardless of everything external to the composition itself, excepting, of course, the material limitations of the art and the artistic sense of the artist, — that as Beethoven, for example, composed sonatas which expressed nothing but harmony, so the painter who would be great should produce pictures without subjects and without names, mere combinations of color, light, and shadow, with no more objective significance than concertos, quartettes, or symphonies, to which, indeed, he expressly likens them. This half of his doctrine seems resolvable into the conceit that painting is pictorial music, — not itself, that is to say, but a modification of something else. This, to be sure, wipes out the other half of his doctrine, but that is his business. It nevertheless might all be very well, or at any rate would hardly be so bad, if painting in its essence were not, as music is not, a representative art: but unfortunately for the new art-philosophy, painting *is* a representative art, and accordingly the corner-stone of the philosophy crumbles, the product of a representative art which represents nothing being necessarily a bastard performance.

We do Mr. Whistler the justice to assume that he has never produced a monstrosity of this description. He is, we are willing to admit, a better artist than philosopher, and paints, as Wordsworth poetized, without much regard to his theory, which shows itself chiefly in his fantastic terminology. We have no doubt that his "Arrangement in Gray and Black" is a lifelike portrait of his mother, his "Harmony in Gray and Gold" a very faithful representation of the scene from Dickens, and his various "symphonies," "nocturnes," "sonatas," and the rest, quite admirable delineations of something or other in heaven above, the earth beneath, or the water under the earth. If he had only called them what they are, and said no more about it, everybody would have admired him, nobody would have wondered at him, and the world might have given him credit for being as good a philosopher as artist. The misfortune is that Mr. Whistler talks too much. He might better pass his leisure in the harmless practice for which we infer that the first of his name was peculiarly distinguished. And it would be no bad thing to try it early on his philosophy, whistling it off, and letting it down the wind. — *Courier-Journal.*

THE RETORT COURTEOUS.

WHO is the English correspondent of *The American Architect and Building News?* Is he a disappointed American architect, or a juvenile just out of his time? Whoever he is, no doubt he has been entertained by Mr. Burges at Kensington, and unfortunately over-

looked, possibly snubbed, by Mr. Whistler or Mr. E. W. Godwin, perhaps by both. His misstatements concerning Mr. Godwin's work at Chelsea, especially Mr. Whistler's house, and his extreme laudation of Mr. Burges's house at Kensington can, we fear, only be explained by some personal motive, unless, indeed, the article was more or less inspired by Mr. Burges. He speaks of that gentleman's library as a "symphony in gold," and of his bedroom so flooded with color that the scarlet furniture is not too crude. Mr. Whistler's front door is described as small, but, as a matter of fact, it is every way larger than the front doors of the old Chelsea houses our American critic so much admires, as our readers will shortly see when we publish the design. He says the door opens directly on a landing of the staircase, when in reality it opens into a lobby or sunk porch; adding further, that steps lead down to "the large atelier below," when in truth the "atelier" is at the top of the house. He indulges in other equally wild, incorrect, not to say vicious, statements, which would be damaging if Mr. Godwin's reputation was not as much beyond the reach of *The American Architect and Building News* as Mr. Whistler's painting is beyond the comprehension of this smart critic who "was not surprised to find on Mr. Whistler's easel a 'symphony in blue;' . . . . as vague as this vaguest of impressionists always is."

In this same muddle of misstatements figure Messrs. Gillows' large houses on the Embankment at Chelsea, which were also designed by Mr. Godwin — "an octagonal front is recessed so that the side windows, instead of getting a wider oblique view, look upon the wall of the next house." This is a gross — we might almost add, a deliberate — departure from that accuracy which, before all things, should be encouraged by gentlemen who set themselves up as critics. Again, "a brick architrave without suggestion of arch work," in which "there must be a hidden band of iron," offends. No doubt the appearance of the architrave is as described in the New York journal, but how is it the accomplished critic should have overlooked the fact that hidden bands of iron occur in horizontal beads to openings of brick construction from the sixteenth century down to the "*bonâ fide* Queen Anne houses" he seems to admire, and about which he knows so much that he describes their roofs as "flat"? — *The British Architect.*

[As it may possibly be known in England who is the regular English correspondent of this journal, we desire to say that the letter which occasioned the reflections printed above was not from the pen of that gentleman. — Eds. American Architect.]

PUBLICATIONS RECEIVED.

The Old House Altered. By George C. Mason. Illustrated. New York: G. P. Putnam's Sons. 1878.

The Art of Garnishing Churches at Christmas and other Festivals. By Edward Young Cox. With illustrations from original designs and ancient examples. Fifth edition, revised and augmented by new designs and illustrations. 1878.

NOTES AND CLIPPINGS.

We wish to draw attention to a change in the publishers' advertisement on page vi. of the advertising pages, where it is stated that the numbers of this journal for November and December, 1878, will be given, gratis, to new subscribers who pay their subscription for the ensuing year before December 25, 1878, instead of December 15, as hitherto stated.

We wish also to draw attention to the prospectus for the ensuing year, and to the new and enlarged premium list, which we have tried to make attractive and useful, which will be seen on the following page.

The Hartford Water Supply. — The *Plumber* mentions a singular piece of municipal stupidity which may have the most disastrous result. Alarmed at the rate at which water was being used — six million gallons per diem — and fearing a water famine, the authorities in Hartford, Conn., shut off the reservoir supply and substituted water drawn from the Connecticut River. Just below the pumping station, not more than three or four rods from it, a large sewer discharges its contents into the river, and tidal action drives the polluted water up to and beyond the pumping station twice each day. The consequence of drawing water from such a source has been that a hundred or more cases of sickness have occurred amongst those who have used the water, the symptoms of the disease being vomiting and purging.

The Art Awards at Paris. — There is much food for reflection in the perusal of the list of awards for painting and sculpture made by the art jury at the late Exposition to the painters of different nations who exhibited there. France, with 1,421 exhibits, has 128 awards, including medals of honor of the first, second, and third classes, honorable mention, and diplomas to the memory of deceased artists. England, with 523 exhibits has 20 awards of various kinds. Belgium, 398 exhibits; awards, 20. Austria and Hungary, 298 exhibits; awards, 17. Italy, 382 exhibits; awards, 17. Spain, 152 exhibits; awards, 11. Norway and Sweden, exhibits, 166; awards, 10. Holland, exhibits, 117; awards, 9. Russia, exhibits, 135; awards, 9. Switzerland, exhibits, 142; awards, 5. Portugal, exhibits, 27; awards, 4. United States, exhibits, 143; awards, 4. Denmark, exhibits, 65; awards, 3. Greece, exhibits, 92; award, 1. We stand, therefore, twelfth in the list of fourteen countries, ahead of only Denmark and Greece, and in proportion of awards to exhibits only of the latter. — *New York Herald.*

The Pantheon at Rome Flooded. — The floor of the Pantheon at Rome was recently flooded by a rise in the Tiber.

Cremation in Bavaria. — The Bavarian authorities have asked the opinions of the Protestant, Catholic, and Israelite congregations and the Board of Health on the subject of permissive cremation. The Catholics will have nothing to do with cremation, the Israelites refuse to express an opinion, the Protestants say it would only necessitate a change of directions in the liturgy, and the Board of Health recommends cremation in the following contingencies: First, after battles; second, during epidemics; third, for the conveyance of remains to distant parts; and fourth, where the soil is unsuitable for burial purposes. The authorities have postponed their decision of the question. In this connection it is interesting to note the progress that this semi-religious and wholly sanitary rite is making in Italy. Here, from January, 1876, till May last, twenty-three dead bodies have been cremated in the city of Milan, one of them that of a woman. Four bodies, ascertained to be of the weight of sixty-three, sixty-two, forty-one, and fifty nine kilogrammes, have yielded ashes to the weight of between two and three kilogrammes. A kilogramme is about two and one fifth pounds.

Drawings of the Old Masters. — A recent number of the *Academy* refers to the exhibition at the Grosvenor Gallery, a year ago, of the wonderful series of designs by Leonardo da Vinci which were loaned by her Majesty from the collection of the drawings of the old masters in the Royal Library at Windsor. If we understand the allusion, this exhibition comprised the wonderful series of anatomical drawings by Leonardo which for thoroughness and accuracy we believe have never been equalled, and which have never been approached more closely than by the series of drawings made by Dr. William Rimmer, now instructor in anatomical drawing in the School of Drawing and Painting, Boston, which was reproduced by the Heliotype process for private circulation. The exhibition at the Grosvenor Gallery demonstrated the desirability of having these drawings of the old masters reproduced by some process so that they may be accessible to the artistic public. The Queen has accordingly given her consent and Mr. Stephen Thompson has prepared the photographic negatives of the drawings which are to be reproduced by the Autotype Permanent Process, and which will be issued shortly in four portfolios. The first two of these will contain one hundred drawings by Leonardo, the third will contain drawings by Raphael and Michael Angelo, and the fourth will be filled with specimens of the works of the early Italian masters together with those of Dürer, Claude, etc.

King Alfred's Palace. — The news of an important archæological discovery at Wedmore, in Somerset, was reported last week to the *Times* by the secretary of the Somersetshire Archæological Society. Wedmore has long been supposed to have been the site of one of the palaces of our early English kings. It was here that Aelfred, in 878, made his solemn peace or "frith" with the Danes, when their leader, Guthrum, was baptized, and Wessex for the time delivered from these harassing Northmen. The thousandth anniversary of this event, which secured for England Aelfred's wise rule and peaceful government, was celebrated last September at Wedmore. Since then the Rev. Sydenham Hervey, the rector of Wedmore, has undertaken excavations with a view of finding the site of the old Saxon palace, which tradition has always pointed out as lying in a field called the Court Garden, about a mile from Wedmore church. Here, then, the rector commenced his digging, and has been so fortunate as to light — almost at once, it would seem — upon the very spot for which he was searching. At a depth of about six to ten feet below the ground he has discovered the remains of massive walls, cemented with ancient mortar. Five distinct lines of these have been opened, and Mr. Hervey is now trying to find out their connection, for they are not merely foundations, some of them being lined inside with plaster. Hitherto no coins have been found, but only a large quantity of pottery, both Roman and early English, some of it ornamented in a rude manner, and one piece, probably the mouth of a jar, representing a small but beautiful female face. "There can be little doubt," says Mr. Hunt, the secretary, who sends the account, "that Mr. Hervey has really discovered the remains of the old palace of our West Saxon kings, the very scene of the high festival at which, one thousand years ago, the peace was signed with the Danes, and the fillet was loosed from the brow of Guthorm, or rather Aethelstan, to call him by his new Christian name. The character of the pottery and the shape of some of the shingles which have been found seem to point to the probability that the old English building was raised upon the site of some older Romano-Celtic villa." It is hoped that funds will be forthcoming to enable Mr. Hervey to carry on operations, for no doubt much more remains to be laid open, and it is especially probable that coins will be discovered, the traditions of the place having always pointed to hidden treasure. — *The Academy.*

A Railroad across Sahara. — A French engineer has made a report on the project of a railroad across the Desert of Sahara. The projected line would run from Algiers to Timbuctoo, a distance of some 1,900 miles, and would rest mainly on layers of sand, and toward the end on primitive volcanic rock, granite, etc. No mountainous obstructions would have to be encountered, and the average heat does not exceed 75° Fahrenheit, but occasionally a very cold night succeeds a temperature of 104° in the daytime. The great difficulty to be overcome would be the want of water, which is not to be procured in that region, but for three trains daily the amount of water would not be too great for engineering skill to supply.

The Value of Sewage as a Fertilizer. — Mr. Alexander Aird, a Scotchman, began seven years ago to utilize the sewage of the city of Dantzic by irrigating with it certain lurrens in the neighborhood of the city. The crops he has raised on this land have been unusually large; for instance, he has raised sixteen and one half tons of potatoes to the acre, and he considers the undertaking such a success that he has lately contracted with the municipal authorities of Breslau, a city of about 250,000 inhabitants, to remove its sewage during twelve years, and with it he intends to irrigate and enrich for his own profit about three thousand acres of land.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, DECEMBER 21, 1878.

CONTENTS.

SUMMARY: —
The American Institute of Architects and our Correspondents. — The Publication of the Proceedings. — The Position of Associates. — The Washington Monument. — Mr. Street and Sir Edmund Beckett. — Architects and Restorations. — Building Accidents. — Dr. Schliemann at Hissarlik 201
ARCHITECTS' COMPETITIONS. I. TRIAL BY PLANS 202
A RETROSPECTIVE GLANCE AT SOME OF THE ARCHITECTURE OF THE FRENCH EXPOSITION. I. 204
THE ILLUSTRATIONS: —
The United States Capitol. — Episcopal Theological School at Cambridge. — The Giralda at Seville. — House at Oyster Bay. — Chapter House of the Delta Psi Fraternity 205
ARTIST BIOGRAPHIES 206
CORRESPONDENCE: —
Letter from Paris — Letter from New York 207
NOTES AND CLIPPINGS 208

IN the lack of any authoritative answer to those correspondents who have complained to us of the special tax levied by the last Convention of the American Institute of Architects for publication of its proceedings for two years, we shall venture to give our opinion of the case, not assuming to speak for the Institute, but simply to record the impression of a somewhat careful observer. The difficulty of this year is that which naturally befalls an association that hastens to diminish its assessments without giving up its sources of expense. Two years ago the Convention, under the spur of some of the Chapters which protested against the amount of the annual assessments, arbitrarily reduced them by twenty-five per cent, in spite of the representations of the Treasurer and some of the more cautious members that the income was no greater than the necessary or established expenditures required; and a special Committee on Finance was appointed to consider the question of revenue. The diminished assessment was found inadequate, and at the Eleventh Convention, a year ago, the Committee on Finance reported a scheme for adjusting the annual fees as closely as possible to such expenses as were decided on, by providing an estimate of the expenses, and levying a corresponding tax on the Chapters, to be collected as they saw fit, while the direct tax on Associates and half of that upon Fellows was remitted. This scheme, adopted readily by the Convention, but referred to the Chapters for ratification, was rejected by some of them, possibly for want of anybody interested to explain its working and purpose to them, and the system of diminished assessments was continued. The report of the Treasurer at the Twelfth Convention (last month) showed that the only thing which had prevented a deficit had been the omission of the publication. This omission, however, did not please the Convention, and a resolution was passed, rather hastily, levying the special tax of which our correspondents complain for the publication of the lapsed Proceedings and of those of the Twelfth Convention.

THESE things we say in explanation of the difficulty in which the Institute found itself and the way it took to relieve itself. It was an ill-considered way, we think; a better one would doubtless have been to restore the annual assessment to its old rate, which would have provided for the Proceedings of the last Convention and for future ones. The omitted publication might have been made up by private subscription, which would probably not have been difficult, or at worst it might have been allowed to lapse entirely for one year rather than pass a measure so unpopular as that we are discussing is likely to prove. As for the main question of publishing or not, it is pretty clear that the prevailing feeling of the Institute is in favor of the publication. A great many members regard it as their chief means of keeping *en rapport* with the Institute, and their chief tangible evidence of its work. We believe that it would be a mistake to give it up. The record in the *American Architect* is of value for immediate information, and for a wider publicity than the Proceedings give, but is hardly sufficient or convenient as a permanent record, nor can it well be made to contain all that it is desirable to preserve. The history of the Institute is a history, directly or indirectly, of the profession in the United States; its debates and reports record pretty accurately and pretty clearly the course of professional thought and architectural development had since they began, as any one will see who will take the trouble to examine them. The question is not, as one of our correspondents suggests, whether in the present state of the book-market the members' copies of the Proceedings for two years are worth eight dollars, for they are not upon the market, and that is not their price, nor are they sold at full price to Fellows and half price to Associates, but whether their publication and distribution is, on the whole, worth the two hundred and fifty or three hundred dollars which is annually voted for that purpose, and of which our contributors are called upon to raise their share, and whether the Institute is willing to vote it.

AS between the Institute and its Associates, one correspondent asks whether they, by joining the Chapters, have put it in the power of the Institute to tax them, who have no votes in the Convention. We understand that they have, as any constituency puts it in the power of its representatives to vote taxes. The Chapters, Associates and all, are represented in the Convention by such of their Fellows as choose to attend, or by special delegates for whom the Associates vote, and whom they may and do instruct as to their action in convention. So that the grievance of the Associates is not taxation without representation, but taxation without a direct vote, which befalls many people. It is certainly possible, as the same correspondent suggests, for the Convention to vote an assessment of fifty dollars on each Associate, or, as another instances, to make the Associates pay all the assessments; but this is not even an imagined danger. On the contrary, the reduction in fees from which the difficulty of this year springs was made at the pressing instance, if we are not mistaken, of Chapters in which Associates predominate; and we may remind our correspondents that the very tax against which they protest has thus been already more than made up to them beforehand by the remitted fees of two years past. We do not undertake to champion the organization or policy of the Institute; we are simply stating what we believe to be the facts, with our belief in the expediency of continuing a publication of its Proceedings. But for the Associates who object to taxation without a vote, there is an easy way to cure it. It is the policy of the Institute to encourage the transformation of Associates into Fellows, and there are no restrictions, we believe, except the nominal one of two or three years of additional practice as architects. There are a great many Associates whose influence as Fellows would be of value to the Institute, and who apparently have no better reason for remaining as they are than want of interest or the small difference in the annual fees. Dissatisfaction with the policy of an association, or lack of interest in its work, may be helped by lending a hand to reform the one or improve the other; and if the seventy Associates, or the greater part of them, were turned into Fellows, it would so improve the revenues of the Institute that those who wish to abate its assessments would find safer ground to stand upon.

THE report submitted to the United States Senate by Mr. Corcoran on behalf of the Washington Monument Commission, of which he is chairman, will perhaps not gratify the persons who are in distress at the deliberation with which the government engineers do their work; but it looks like business, if only the business of preparation. The engineer's estimate of the cost of securing the foundation according to his plan exceeds the part of the congressional contribution appropriated for that purpose, says Mr. Corcoran; nevertheless, "the Commission has limited the cost of that part of the work to the amount named in the joint resolution of Congress." How this discrepancy between the engineer's plans and the intention of the Commission is to be got over does not yet appear, but the engineer's preparations are going on; we may therefore infer that things are expected to come right in the end. A good amount of material has been collected; pugging-mills for the concrete have been set up, and steam-engines to run them; sheds have been built for the workmen; oak and pine timber provided for framing and shoring in the trenches and tunnels of the new foundation; and, what is of great importance, considering the old controversies on the stability of the monument, bench-marks have been set for permanent levels, by which it is proposed to take daily observations that will detect any settlement that may occur as the work goes on. Contracts have been made for various materials, — lumber, stone (blue gneiss), and broken

stone, cement, sand, and gravel for the concrete. A large array of derricks and tackle has been provided, the old roof and derrick taken down from the top, and a staging built to carry the new derrick and workmen, so that work may be commenced at both ends of the monument. As yet no great inroad has been made on the appropriation, the amount spent being, to the end of November, only $1,150, and in preparing for the continuation of the superstructure $7,800: but we doubt if in the long run even the government engineers will find any difficulty in spending the money furnished for the monument as fast as they get it.

Most of our readers have some familiarity with the name of Sir Edmund Beckett, the thorn in the side of our profession in England, of whose Book on Building and its wholesale attacks on architects we gave some account not very long ago (*American Architect*, March 30, 1878). It is not a great while since the Royal Institute of British Architects undertook to weave their thorn into a crown by electing Sir Edmund, with several other men of note, to their new grade of Honorary Associate. This, which might have seemed to outsiders an indication of a change of heart on his part, is declared by our *confrère*, the *Architect*, to have been universally recognized as a simple act of propitiation. It would appear that, as propitiatory acts are apt to be, this was fruitless, and the thorn continued still to turn inward. At about the time of Sir Edmund's election the *Athenæum* reported that Mr. Street, who has been for some years busy with a careful restoration of York Cathedral, had been superseded in this work by Sir Edmund, who is the bitter adversary of restorers. A rumor so preposterous as this naturally proved untrue; but Mr. Street soon informed the *Athenæum* that nevertheless his services as consulting architect of the Diocesan Church Building Society, whose office it was to revise the designs of churches built in the diocese, had been dispensed with, and that, as he understood, Sir Edmund was reigning in his stead. When the Archbishop replied in a published letter that the office was simply discontinued, and that no one occupied it, Mr. Street rejoined that he had just examined the designs for a church in Yorkshire, whose specification was scored with remarks, "meant to be practical, all of them characteristic, and some of them satirical, as to the authorship of which there could be no mistake, since one of them directed the architect to 'see my Book on Building, page —.'"

Doubtless the question of church restoration is at the bottom of this disagreement. Mr. Street has been reproached for his restorations of the cathedral, which nevertheless, touching mainly the thirteenth-century work of the south transept, that had suffered severely at the hands of earlier and less skilful restorers, have been made, we believe, with great skill and conscientiousness. It is not so strange that persons who have a tender regard for old buildings, and who dread the enterprise of architects, should be willing to put their maintenance under control of men whose only care will be to stay what exists, and who will rigorously refrain from addition or substitution. But as a question of actual restoration, it is fair to ask, How does the restoring of to-day compare with that of a century ago, under Wyatt, for instance; or a generation ago under Smirke, perhaps, or Gwilt? and who are responsible for the improvement if not the architects? If the English clergy, whose church-building has been the nursery of modern English architecture for this generation, should break with architects and betake themselves to dabblers, it is hard to tell what would become of their architecture, to say the least. It is very queer to find a paper of the standing of the *Athenæum* saying that "the appointment of Sir Edmund Beckett is not the only, nor by any means the least justifiable instance of a tendency we observe on the part of custodians of ancient buildings to entrust these remains to others than professional architects." But when we find the Archbishop of York appointing a clever barrister to supervise church designs because he has shown himself an active tormentor of architects, we are not surprised to learn from Mr. Street that "a very formal protest against Sir Edmund Beckett's interference as consulting architect has been sent to the Archbishop by four of the most eminent architects of the day, who have had practical experience of Sir Edmund Beckett's action." It looks like a curious instance of the prevalence, in places where we should look for a better knowledge of human nature, of the popular impression that the one qualification of a reformer is the ability to find fault.

During the past week or so we have had our due share of building accidents, two of which are characteristic. In New York, a pair of unfinished houses, built by a speculating builder, went to pieces in a storm. They were brick houses "with Ohio-stone trimmings," separated by a party wall which is said to have been only ten inches thick. This wall had to support its half of three floors and a roof, of twenty-five feet bearing, in each house. During the storm of a few days ago it crumbled into the cellar, carrying the floors with it, not being blown down, since it was stayed by the floors, but sinking in a heap at the bottom. The only explanation that we see offered of the phenomenon is that the wall was drenched, and the cellar full of water. This is an explanation which has been not uncommonly given in like cases, from which we may begin to infer that we must expect to see a new building washed away unless it is covered in before it rains. Another case is that of a building in Pittsburgh, where a thousand bushels of malt, weighing some thirty-four thousand pounds, were put into a large room in the upper story with a safe weighing a thousand pounds, and broke the floor through in the night. We are not told over what area of floor the load was distributed, a point which seems in the newspaper view immaterial, while the lessee and proprietor are disputing who is to pay for the damage,—the lessee because the floor was too weak, or the proprietor because it was too heavily loaded. Both this and the other case teach the same lesson, which is the absolute ignorance that prevails among people who own and occupy houses, and even those who build them, of what can be expected from building materials. Building laws specify the proper thickness of walls, but so long as tenants and owners take it for granted that any building may be expected to hold whatever it is convenient to lay on it, the only safe way will be to insist on a maximum of strength everywhere.

Dr. Schliemann has written to the London *Times* an account of his renewed explorations on the site of Troy, which he began with the month of October. The Turkish government obliges him, while doing all the work at his own expense, at a cost of $2,500 per month, to give to the Imperial Museum at Constantinople two thirds of all his findings. A Turkish officer with a guard of soldiers is set to watch him and see that this condition is fulfilled. He expects in this season's work to uncover the whole western and northern sides of the circuit wall of the four superposed cities, the second of which he considers to have been the historic Troy; and to finish the unearthing of the great ruins in the northwest corner, which he has described as the Cyclopean foundations of Priam's palace, in and near which his rich collection was found. The nine or ten feet of ashes, red, black, and yellow, with which these foundations are covered give proof to the doctor of a very high and stately wooden building. He has already in continuing his excavations found a considerable number of gold ornaments, pins, earrings, necklaces, and beads, some of them like ornaments found at Mycenæ. One of his most curious discoveries is a wooden distaff eleven feet long, with the thread still upon it, though charred to a coal; and three successive broad gates have been found before the so-called palace, which he expects to demonstrate beyond a cavil to be Priam's. It would be rather curious to know on what principle the authorities will arrange their division of spoil with him. Gold and silver are easily appraised, and duplicates distributed; but in the offsetting of one thing against another the Turkish officials will be very likely, one would think, having no standard of their own, to gauge their estimate of each thing by Dr. Schliemann's desire to possess it. But Dr. Schliemann is the most disinterested of discoverers, and would prefer, we may be sure, that all the tangible fruits of his explorations should pass out of his hands, rather than that his work should be interrupted.

ARCHITECTS' COMPETITIONS.

I. TRIAL BY PLANS.

We noticed in our summary of last week Mr. Barry's protest against architectural competitions, and the advice he had given in a case where he was asked what kind of competition he would recommend. An open competition, he said, was the worst course possible, a limited competition was only less bad, and his advice was therefore not to choose from plans, but to select a man. He nominated half a dozen, and following his advice the committee selected Mr. Waterhouse. We quoted also the *Architect's* comment on this,—that it was to get rid of

the ascendency of names that competitions were devised; and that of the *Building News*, — that they are the only means of bringing forward the young men of the profession. The question at issue between Mr. Barry and these journals is the existence of competitions at all, into which we shall not enter here. Competitions have many disadvantages and some advantages; but at present they are the accepted means of choosing a design or an architect for important buildings. Mr. Barry's remarks, intended as an absolute protest against this means, suggest a distinction, which is really important, between two different views of their uses, and two correspondingly different ways of administering them, so long as they are accepted.

It may be the purpose of a competition to select a plan, or to select an architect; and though these two things may seem at first glance to amount practically to but one, they really imply very different attitudes in the client, and lead logically to considerable differences in management. The ordinary building-committee considers that its office is to select a "plan," meaning a design, and this is the theory of common competitions. In this theory the design is everything, and the architect is considered to be impersonal, or a fixed quantity, — a constant term in a formula, to be allowed for once for all, and without effect in the comparison of values. Therefore, since one architect is like another, the only difference between them being in their plans, or in their power to influence a committee by favoritism, which is illegitimate, the necessary condition is to eliminate the architect absolutely from the trial. Hence the competition must be anonymous, and the names of all but the successful competitor may remain unknown. The architects may be trained or untrained, faithful or negligent, discreet or reckless, but since the trial is a trial of plans these things must be put out of court, except so far as they are indicated in the drawings, in order to reduce everything to a competition of designs, pure and simple. When it is limited to a selected few it is possible to include in the selection only architects in whose skill, experience, and faithfulness there is reason to have full confidence, and they may be taken from the top of the profession, — if they can be induced to compete, — but in an open competition no such limitations are possible. This is the ideal in which the lovers of competitions delight, and it is the only logical form of trial by plans. It gives an opportunity for young and unproved ability to come to the front, and is intended to exclude favoritism; these are advantages, but they have their offsets.

This sort of thing leads necessarily to certain conditions requisite for due protection of client or architect, which do not always consist very well one with another. A client or a committee, pledged to adopt a design without knowledge of its author, may with some fairness insist on being so thoroughly informed by the drawings and descriptions of it as to know just how it is to be carried out and constructed, and just what its cost is to be. Hence the natural, but to competitors vexatious, tendency of building-committees to insist on full drawings, specifications, and estimates, — enough, in fact, to enable them to make contracts. These they are not apt to get absolutely, and their failure to get them often makes misunderstanding and mischief; but their requirements do lead architects to spend an enormous amount of work on competitions, nineteen twentieths of which, in the gross, is of necessity thrown away. The expenditure of so much work on the part of competitors makes the trial a very costly one to somebody. The committee might reasonably be expected to bear the cost, since the benefit is theirs; but usually a committee takes advantage of its position to shirk it, and can induce a number of architects to compete at their own expense. Except for a trifling premium or two, the first of which, by a fine figure of speech, is often declared to "merge in the commission," — that is, not to exist at all, — no pecuniary benefit inures to the architects who take part, since the successful one gets no higher fee than if he had been directly chosen, like any other professional adviser, and the rest get nothing. It is a very cheap device for the client, but is none the less prodigal because the cost falls only on the architects.

It is natural that architects, considering the benefit to the client and the cost to them of such competitions, should incline to insist on some conditions, and accordingly they regard it as a breach of faith if some one of the designs submitted is not adopted, and if the author of it is not employed to carry it out, or even feel injured if in the end the author of the selected design is allowed or obliged to make any important change in its carrying out. Still more inconvenient in practice are the conditions, which nevertheless are strenuously insisted on by architects, and indeed in fairness must be, that the limits of cost and of time allowed for the preparation of designs must not be exceeded. Those things are more or less logical deductions from the principle of trials by plan, or from the way in which they are conducted, particularly from their eleemosynary character; but they hem in building-committees with restrictions which are apt to be found irksome, and which therefore, when it comes to the pinch, are very apt to be disregarded, to the indignation of competitors and the stirring-up of endless recrimination and strife. Yet here there is something to be said for the client, and it would not be altogether strange, from his point of view, if, having set up a trial for designs, and nothing but designs, he should object to being in the end saddled with an architect whom he may have reason to distrust, or to giving up the design he really preferred, because it cost more than he at first intended. Perhaps after all the really consistent form of open competition would be one which eliminated the architect altogether, but this would be far from palatable to the profession. In fact, the whole system is so hedged about with inconveniences, awkward restraints, and temptations to unfair dealing that it is an unending source of complaint, and whatever its advantages, the objections to it, stated in detail, would make a very long catalogue.

But even the effective results are by no means so good as it is common to assume. To say nothing of the showy, *ad captandum*, and often misleading manner in which architects are tempted to finish their drawings, economy and success in competitions require great promptness in decision and rapidity in execution; the more because, as we have seen, the logical condition of trial by plan is that designs shall be fully worked out, and fortified by complete descriptions and estimates. This means that they must be maturely executed without being maturely considered, and the architect having done this with much labor, but with insufficient thought, is mentally, as well as outwardly, committed to a design which, with more deliberation, he would have changed, but which, having taken possession of his mind, is therefore an obstacle to progress, even if the fact of having carried his work to completeness were not in itself a strong inducement, and a kind of bond with his committee, to take it as it stood. Thus the result is usually a collection of designs produced at great cost to a company of architects, wrought out with much completeness but yet immature, presented by architects who are assumed to be capable and trustworthy, but of whose qualification the committee have presumably no knowledge; and a code of restrictions which, having in the beginning been a serious inconvenience to the competitors, is likely in the end to be a serious annoyance to the judges, — a very fair opportunity for blundering and disappointment on the one part, for dissatisfaction and recrimination on the other.

Perhaps, however, the greatest practical difficulty of trials by plan is still another, and that the one which those who administer them are least inclined to suspect, — the difficulty of deciding them. An ordinary building-committee is probably inexpert in its duties, not qualified by knowledge or experience to judge of an executed work, still less to prejudge a building by the drawings from which it is to be executed. Here, if anywhere, the knowledge of a professional adviser is necessary; and if it were a *sine qua non* with a committee to do with as little professional assistance as possible, we should be tempted to say: "If you must stint yourselves in professional service, get a trustworthy and skilful architect to select for you among your competing plans, and then put the successful design into the hands of a competent superintendent, — if you are allowed, — rather than trust yourselves to select a design and an architect by an open competition." If it were a company of architects in search of a design, a trial by plan would be a natural resort, for they would know the meaning of the designs, and could, in some degree, trust themselves to draw from them the most necessary inferences as to the architects who made them. The more purely monumental the work, to be sure, — that is, the less dependent on practical considerations, — the less important are such personal qualifications as are not indicated in a design; but then the more purely technical are the qualities demanded, and therefore an ordinary jury is the less competent to decide them without professional assistance. But these considerations seem not often to occur to building-committees. They seldom distrust their own capability to judge what is set before them, or imagine that there is anything more in an architect's design than they can see. The natural consequence is that they underrate the professional skill which they do not

measure or even see, and the profusion with which professional labor is offered them makes them undervalue that. The habit of considering the architect's plans as the whole test of his importance tends to make them regard his function as simply ministerial, to the loss of his dignity and the injury of his work.

Whatever then may be the benefit to the profession of the system of trial by plans, which is the essence of open competitions as they are commonly understood, it is clear that their faults are very serious. They are extravagantly costly and their cost is borne by the profession; to be fair, they must be hedged about by complicated and embarrassing restrictions; they are breeders of distrust and recrimination, if not of fraud; they encourage hasty and immature, and therefore inferior work; they are uncertain and disappointing in their results; and they tend, in some ways at least, to lower the standing and repute of those who take part in them. At another time we shall consider how some of their evils may be modified, — not, as Mr. Barry suggests, by avoiding competitions altogether, but by using them for the selection of architects.

A RETROSPECTIVE GLANCE AT SOME OF THE ARCHITECTURE OF THE FRENCH EXPOSITION.

I.

Your readers have had opportunities of becoming acquainted with the general plan of the Paris Exposition buildings, as well as of making themselves familiar, from the descriptions and illustrations given in your columns, with their cost, size, and other like details. I will therefore confine myself to the impression left on my mind by the architecture of the main buildings, after repeated visits to them. It is as well from what different witnesses tell us of the effect on them of a work of art, as from detailed statements about it, that those of us who have not seen it usually form an idea of the nature of its merits. And I shall also endeavor to describe what I have to speak of so far as to enable those who have not given attention to plans and illustrations of the Exposition still to form some idea of the adaptability of the buildings to their site and for architectural effect.

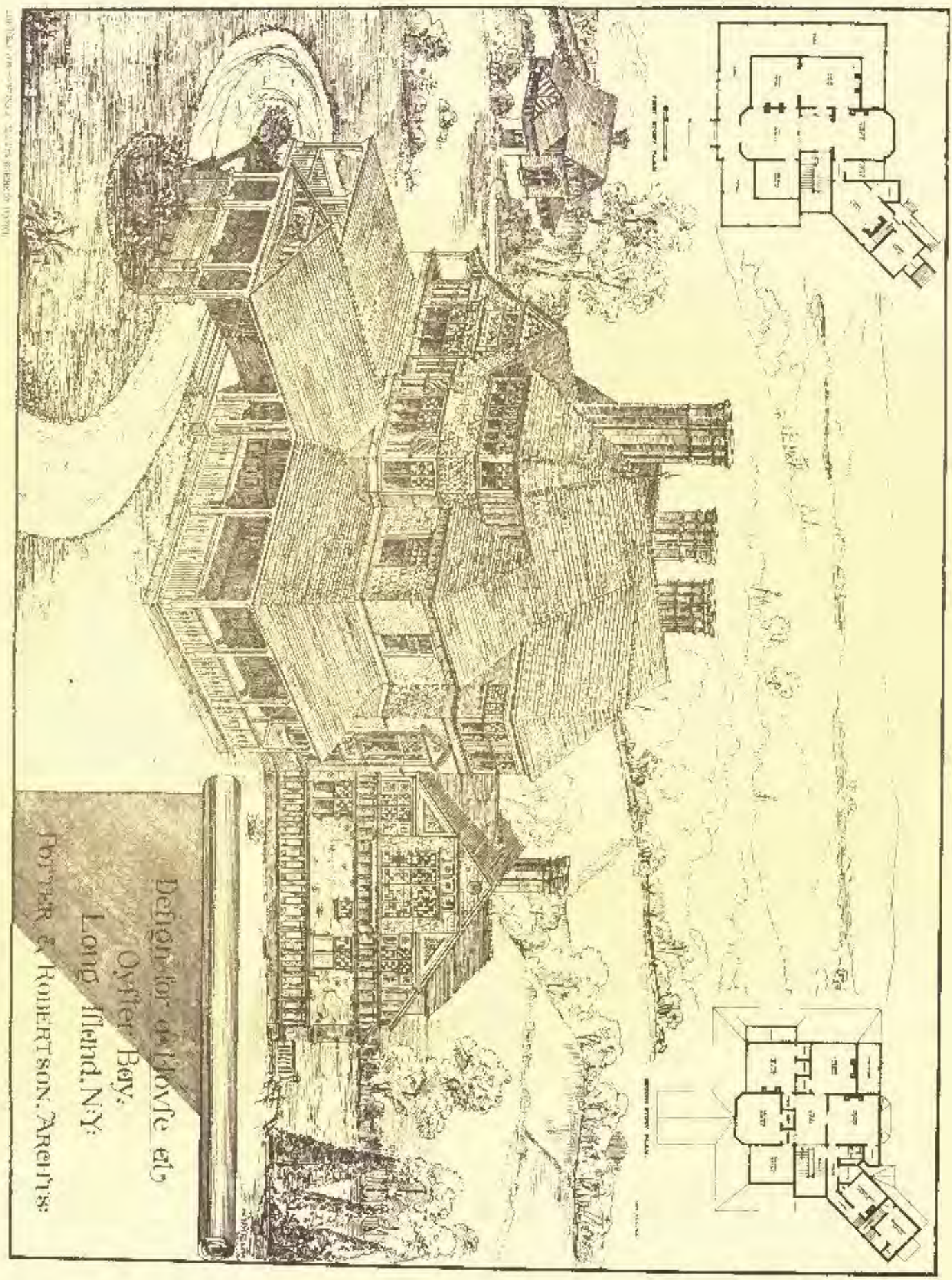
In the first place as to the site itself. Nothing in some respects can be finer. Every one, whether he has seen Paris or not, knows, in a general way, that the Seine flows through the heart of the city, dividing it into two unequal portions, which are connected here and there by bridges. Most persons know also that on one side of the river is the Latin quarter or students' quarter, with its schools of art and science; the Faubourg St. Germain; the dome and hospital of the Invalides; the palace and gardens of the Luxembourg; and that on the other side of the river stretches the major part of Paris, where are the Louvre, the Hôtel de Ville, the Tuileries, the Boulevards, the Champs Elysées, the opera houses great and small, the principal theatres, hotels, cafés, restaurants, and shops. In the middle of the river, on a small island, which itself forms a little city in the midst of this vast city, stands the Cathedral of Notre Dame, one of the most splendid of the monuments which have been spared to us. If one mounts to one of the airy galleries which adorn the west front of the cathedral, and, with his back to the building, looks towards the setting sun, he will look down a broad and magnificent water avenue, lined on each side with palaces and beautiful gardens, perhaps every one famous for its historical interest or as a work of art, and the whole presenting, especially in the months of May and June, when the foliage is at its best, one of the most splendid spectacles that the eye can rest on.

It was in the month of May that the Paris Exposition was opened, and it is at the end of this magnificent vista, and closing it in, where the river takes a bend to the left and is lost to view, that the permanent building of the Exposition, the latest great building to attest the enthusiasm and skill of the present age, stands, on the heights of the Trocadéro. At its feet, on the other side of the river, in the angle formed by the bend of the stream, on a flat, open space used as a parade-ground and known as the Champ de Mars, stand the series of non-permanent buildings, built to house the major part of the Exposition. The ground between the permanent building on the heights and the river is laid out in a beautiful garden, embellished with fountains, descending in terraces, and admirably managed so as to give an effect of space and freedom, while not too large for its purpose. The temporary buildings on the other side open on a flowery terrace which forms here the river-bank. This terrace on one side of the river and the garden on the other are connected by a broad, avenue-like bridge, and the two form thus one composition, not too wide, not too much filled with shrubbery, but just wide enough, open, smiling, lying spread out in a sort of semicircle before you as you come out on the terrace, of which the terrace on which you stand makes the base or straight side. While the whole is very brilliant and striking, it is also very inviting, and gives a most refreshing change after the heat and bustle of the necessarily long walk through any of the many avenues of the non-permanent buildings. That the site of the permanent building gives a splendid opportunity to the architects will be seen even by those who have had no better opportunity of forming a notion of it than that just given. The Trocadéro or high ground on which the building stands is almost or quite the highest ground within the lines of Paris. It in fact overlooks the greater part of the city. It is situated where it is on one of the outer rings of the city, but yet not outside of it. It is close to the most fashionable and in many respects the finest of the new quarters of the city. The view from it is superb. A building erected on this magnificent site has only to be beautiful to atone for all lack of architectural display or effect in the temporary and necessarily major part of the buildings required to house a great exhibition. And it is fortunate that this superb site is so close to the river, and to all these buildings on the other side of it, that it is no fatigue to pass from one to the other. The one and the other can form this, not two things, not a sprawling pair of things too wide apart, but a well-combined and concentrated whole.

It seems to me that as far as plan goes every advantage has been taken of this splendid site, and the splendid opportunity which the Exposition gives to make use of it. The temporary buildings are convenient, commodious, well lighted, and well arranged in their general relation to each other. There was no occasion to try and make an architectural effect and *ensemble* with them, as has been the case with other exhibition buildings, and was so successfully accomplished in the Vienna building. For architectural effect, for which one involuntarily looks wherever there is a great enterprise involving building, one naturally, in this case, turns to the permanent building on the Trocadéro, which crowns, dominates, and finishes the whole. In the non-permanent buildings, therefore, the architects seem rightly to have studied use and convenience more than beauty or architectural effect. They are laid out upon a sort of gridiron plan. The buildings are big iron-and-glass sheds or galleries, seeming lofty enough when seen from the inside, but not remarkable in any way as exteriors. These sheds or galleries answer to the bars of the gridiron, while the spaces between them form narrow, long courts, used for light, and planted with grass and flowers. Some of these courts are so wide as to have buildings in them. One of these is called the Building of the City of Paris. Another is devoted to the fine arts exhibition, and so on. They are frame buildings. But the frame is of iron, not covered but shown, and the interspaces, when not glazed, are filled in with brick laid in patterns, or sometimes overlaid with tiles, often highly glazed, and so painted that one picture covers a large surface made up of many tiles; besides tiles there is a variety of ornamentation with porcelain and terra-cotta work, and much color and gilding is used, principally on the iron-work. These are interesting buildings because of the comparative newness of the methods of building, and to some extent of decorating, which they show. A small iron frame building of this kind, but with little or no decoration, was sent out to the Philadelphia Exhibition, set up in its grounds, and used for the exhibition of French stained-glass and ecclesiastical decorations. Here at the Paris Exposition we have the same method of construction employed on a much larger and more important scale. Tension, which hitherto architectural usage has chiefly employed, or, when driven to use, has hesitated to handsomely acknowledge its obligations to, is largely employed in these buildings; but, unlike the concealed chain around Brunelleschi's dome, it is here a confessed principle of construction; unlike the tie rods in the arcades of the Venetian ducal palace, it is here a decorated and boasted principle of construction. It is curious how a principle sleeps, though always existing, until the moment comes when its general recognition becomes useful to mankind. The invention of railroads makes easy the moving of iron; this stimulates its production; it is the readiest material for ties; since the archæologist says architects may not use them, the profession of engineers arises unhampered to do so; now comes architecture creeping along to take part in the benefit. But that things can be tied up, as well as stood up or propped up, and so kept where you want them, in other than Greek or Gothic fashion, has always been known. Man now comes to employ in architecture a method which he has always employed in daily life. And as the arch, unknown or neglected by the Greeks, used but not adorned or handsomely acknowledged by the Romans, comes later to be both, until at last in the Gothic it takes our breath away in wonder at its achievements, so the tie, unknown or despised, now coming to be taken in hand, promises a future probably more wonderful.

But, though these Paris buildings are interesting from their construction, and also from the great reliance put upon tiles, porcelains, and color in their decoration, all things of which much has been written and hoped of late years, yet they cannot, I think, be fairly called handsome, or even pleasing. That they were meant to be pleasing, and more than merely pleasing, we infer from the expense evidently put upon them. There is an effort, or at any rate a great expenditure of means, to make them admired; but the result is painfully incommensurate. The fashion is new, the material rich, yet the cut of the coat is not happy. But the first examples of new methods are apt to be ugly; perhaps because the attention of the artist is directed rather to the method than to the importance of using it with grace. Indeed, until an artist is familiar with the use of a new means, he can scarcely employ it with freedom, and so scarcely with grace. And then, even, he must have the gift of grace, — a rare gift.

It is opposite these buildings, and in one of the large courts, that the principal nations which have taken part in the Exposition have erected a series of façades, which serve as entrances to the portions


Design for a House at
Oyster Bay,
Long Island, N.Y.
POTTER & ROBERTSON, ARCH'TS.

THE HELIOTYPE PRINTING CO. 220 CHESTNUT ST. BOSTON

EPSILON CHAPTER HOUSE OF THE ΔΨ FRATERNITY
TRINITY COLLEGE
J. CLEVELAND CADY ARCHITECT N.Y.

ARCHITECTS.
STEPHEN L. HALLET (*France*), 1792–94.
GEORGE HADFIELD (*England*), 1794–98.
JAMES HOBAN (*Ireland*), 1792–1802.

THE UNITED STATES

E

APITOL, WASHINGTON, D. C.

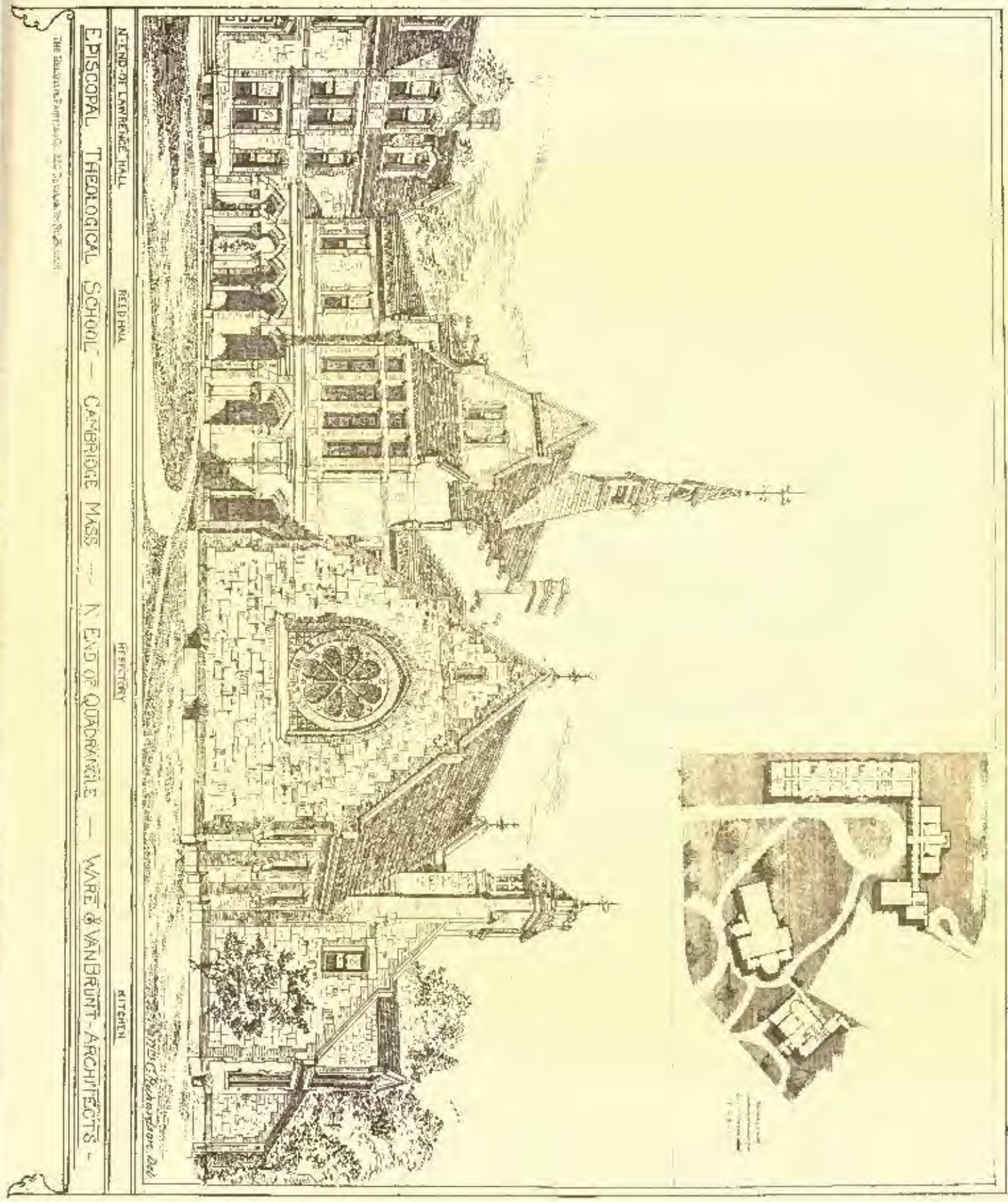
FRONT.

ARCHITECTS.

BENJAMIN H. LATROBE (*England*), 1803–17.
CHARLES BULFINCH (*Boston, Mass.*), 1819–30.
THOMAS U. WALTER (*Philadelphia, Pa.*), 1830.

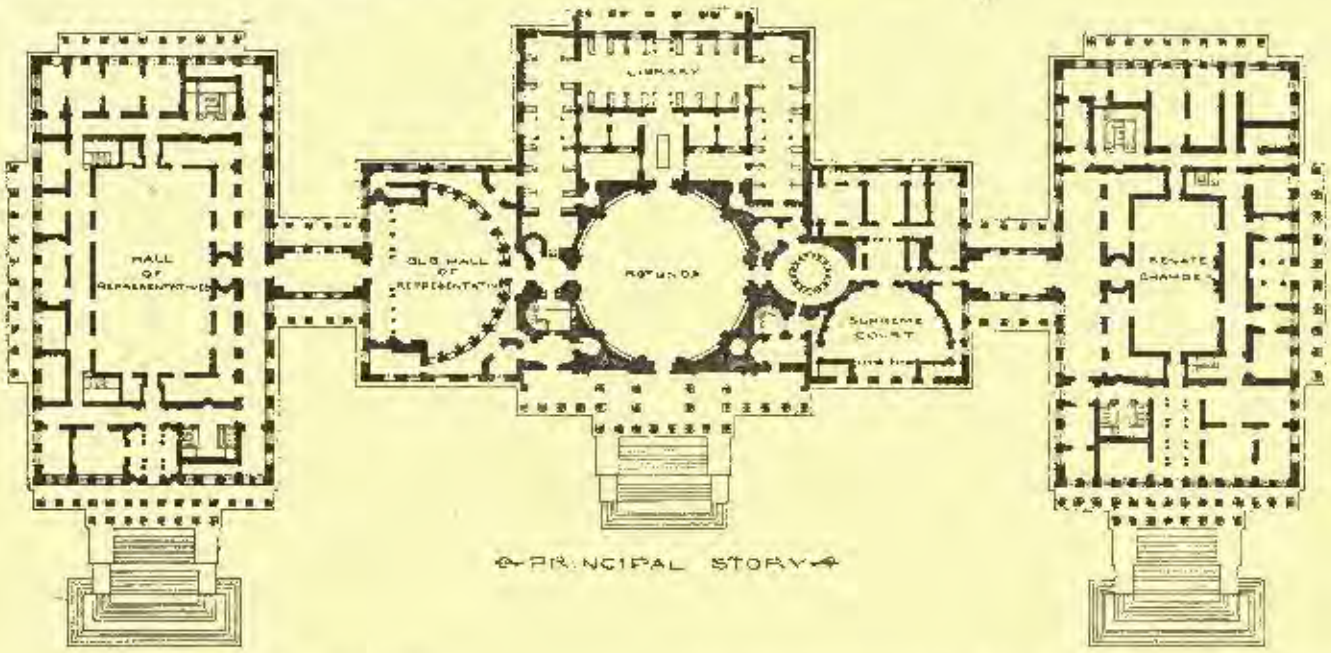
A STREET IN SEVILLE ✻ SPAIN ✻ THE GIRALDA ✻ L.S.IPSEN, DEL.

THE HELIOTYPE PRINTING CO. 239 DEVONSHIRE ST. BOSTON



EPISCOPAL THEOLOGICAL SCHOOL — CAMBRIDGE MASS. — N. END OF QUADRANGLE — WARE & VANBRUNT, ARCHITECTS.

of the Exposition devoted to the products of each of them. Of these the Belgian is remarkable, as seeming much the most costly. It is built of brick and stone, with columns of polished marble. It is several stories in height, and of considerable length. It is also remarkably handsome. Near it is a very pretty, quaint English house-front in the prevailing Queen Anne manner. I happened to see a perspective drawing of this house-front at the Academy Exhibition in London. The drawing was prettier than the house. The house had more quaintness and character than the drawing. The drawing seemed made by one who was rather an artist than an architect; the house seemed made by one who was rather an architect than an artist. The architect was learned in the detail, and deeply imbued with the fashion of the day. The artist was imbued with that sense of grace and happy proportion of parts which belongs to no fashion, which no fashion carries with it, however fashionable, and which need be absent from no fashion, however unfashionable. These and the other fronts in this street of façades are supposed by the Parisians to be representative of the architecture of the several countries to which they belong. But they are really representative rather of the temper than of the architecture of those countries. Spain has erected something with the details of the Alhambra and other now scarce Moorish buildings in Spain; and so recalls a past glory, without a future. The material prosperity of Belgium and what it owes to a liberal and good government, as well as the picturesqueness of its past and the promise of its future art, are all seen in the Belgian façade. English wealth, individual enterprise, and the lead in matters of taste which England is now taking are all seen in the series of English façades. Again, the American façade, which is tawdry and without character, looks like nothing which I ever saw in America or elsewhere. But the very fact of its not being more a credit to Americans, and not being at all representative of American buildings, is thoroughly illustrative, in the money spent, of the kindly feeling of the American people and government toward the Exposition, and in the carelessness as to the way the money is spent, of the lack of material interest in the Exposition intuitively felt by both the mass of the people and their government; illustrative, in fact, of the adage that what is everybody's business is nobody's business.



THE ILLUSTRATIONS.

THE UNITED STATES CAPITOL, WASHINGTON.

(Gelatine Print.)

THE United States Capitol at Washington, of which we publish to-day a double page heliotype illustration, has a varied and not uninteresting history. In July, 1792, the task of building the Capitol was awarded to Stephen L. Hallett, by birth a Frenchman, whose design was successful in the competition instituted by Thomas Jefferson. On September 18, 1793, the corner-stone was laid by George Washington. Hallett was the object of much jealousy, and was, during his short term of office, which lasted only until July 1, 1794, engaged in a struggle with a would-be usurper of his position, one Dr. William Thornton, an amateur. It was not until 1871 that Hallett's claim to be considered the first architect of the Capitol was finally allowed and his designs restored to their proper place in the archives. The next architect in charge was George Hadfield, an Englishman, who carried on the work until he was driven from office, in 1798, by the same treatment that had banished his predecessor. James Hoban, an Irishman, next succeeded to the office, and under his administration the north wing was finished in 1800. In 1803, Hoban was succeeded by Benjamin H. Latrobe, an Englishman, who continued in office until 1817. During this period the south wing was finished, and both wings, which, on August 24, 1814, had been partially destroyed by fire set by the British troops then holding the city, were rebuilt. In 1818 the central portion of the building was begun under the direction of Charles Bulfinch, who finished the original building in 1827 at a total cost of $2,433,844.13. The necessity of providing further accommodations for the ever-increasing body of government officials had become so apparent in 1850, that a competition was held which resulted in the award of the premium of $500 to Charles F. Anderson, an Irishman. His design was not, however, carried into execution, as the government had reserved the right to build in accordance with the accepted design, or adopt a new plan which should combine the good points of the several designs submitted. This last course was followed: Mr. Thomas U. Walter, of Philadelphia, now president of the American Institute of Architects, was appointed architect of the Capitol extensions, and remained in office until they were virtually completed. Since that time the building has been under the charge of Mr. Edward Clark, who is the present incumbent of the office. Work on the extensions was begun by laying the corner-stone July 4, 1851, and was finished in 1867. The original building, the present main building, was built of a porous sandstone, obtained from Aquia Creek, Va., which is painted white so that it may harmonize, as far as possible, with the new portions, that are faced with white marble obtained from Lee, Mass. The wooden dome of the original building was taken down in 1856 to give place to the present iron dome, which is said to contain 8,909,200 pounds of iron. This dome, unquestionably one of the great achievements of architecture in this country, was finished in 1865. It is surmounted by a bronze statue of Freedom which was modelled by Crawford. The figure is nineteen and one half feet high, and weighs 14,985 pounds. The apex of the dome is 288 feet above the base line of the east front, and is therefore a less lofty dome than St. Paul's at London. Its height above the balustrade of the main building is 217 feet; its greatest diameter is 135 feet 5 inches; it surmounts the circular entrance-hall known as the Rotunda, which is 95 feet 6 inches in diameter. The interior of the dome is at present being decorated in true fresco by the veteran artist, Brumidi. The greatest length of the building, which is said to have cost more than thirteen millions of dollars, is 751 feet, and the greatest width is 324 feet, including steps and porticoes. The wings of the building, which are commonly known as the "extensions," are placed at the north and south ends of the building and contain respectively the Hall of Representatives and the Senate Chamber, which are of nearly similar size, and in spaciousness offer a marked contrast to the somewhat gloomy and cramped chambers in which sit the houses of the English Parliament. The semicircular hall shown on the left of the main building is the old Hall of Representatives, now the National Statuary Hall, or Hall of Heroes, in which each State of the Union is to be represented by statues of two of its most noted citizens. Here Rhode Island will be represented by General Greene and Roger Williams; New York by George Clinton and Robert R. Livingston; New Jersey by General Kearny and Richard Stockton; Massachusetts by Governor Winslow and Samuel Adams; Connecticut by Jonathan Trumbull and Roger Sherman; Maryland by Charles Carroll and Roger B. Taney; and Pennsylvania by Robert Fulton and General Muhlenberg. The Library, on the west of the main building, was burned by the British in 1814, and was again partially destroyed by an accidental fire in 1851, when 35,000 volumes were burned.

PROTESTANT EPISCOPAL THEOLOGICAL SCHOOL BUILDINGS AT CAMBRIDGE, MASS. MESSRS. WARE AND VANBRUNT, ARCHITECTS, BOSTON.

The marginal plan shows the condition of the grounds of the school when the additional buildings now in contemplation shall have been completed. Of the buildings already erected, St. John's Chapel was built by R. M. Mason, Esq., as a family memorial, and presented to the school in 1870; the Dormitory, by Hon. Amos A. Lawrence, also as a memorial, in 1873; and the Central Hall, containing the library and recitation rooms, by the late Benjamin T. Reed, Esq., the founder of the school, in 1875. The drawing exhibits the north end of the quadrangle completed, on its west side, by the northward extension of Lawrence Hall, according to the original plan, and on its east side by the erection of a refectory with kitchen, waiting-room, and other offices; the Dean's house east of the chapel will be built in 1879. These buildings are of Roxbury "pudding stone," with dressings of red brick and Pictou sandstone. The Dormitory completed will contain chambers for about forty students. The central corridor of the Dormitory, communicating with an open cloister carried along the front of Reed Hall, will enable the students to obtain access to the library, recitation rooms, and refectory, under cover. The three main buildings of the quadrangle are thus connected by an extension of the cloister in each corner; but they are otherwise separated. The library and refectory are open-timbered halls.

THE GIRALDA TOWER, SEVILLE, SPAIN.

Seville, the city in which is the Giralda, one of the most interesting towers in the world, was, during five centuries, held by the Moors, and during that time it was almost wholly rebuilt, the material used being in great part the ruins of the Roman town Hispalis. The city, which is nearly circular, was fortified by walls five miles in circuit, pierced by fifteen gateways, and surmounted by one hundred and sixty-six towers, of which about a hundred have perished. The tower which is the subject of this illustration was begun in the eleventh century, and finished about 1195, in accordance with the intentions of its designer, who is commonly supposed to have been Al Geber. It is thus about two hundred years older than the cathedral to which it is attached, which was begun in 1401, completed in 1519, and is attributed to Alfonzo Martinez, architect of the Chapter in 1886, or to Pedro Garcia, who held that office in 1421. The cathedral is four hundred and thirty-one feet long and three hundred and fifteen feet wide, its width being divided into seven aisles. As may be inferred from the time consumed in building and the different architects employed, the architecture is not purely of one style; but one is not prepared to find among the last architects of the building Diego de Riamo, a man of such eclectic tastes as to design and build in the same year the Gothic Sacristia de los Calices, the plateresque Renaissance Sacristia Mayor, and the modern Italian Chapter House. Gwilt says of the cathedral, a small portion of which is here shown: "The cathedral at Seville was principally rebuilt by Ferdinando Ruiz, who was much engaged in the city, and especially on enlarging or raising the well-known tower called the Giralda. This singular edifice was begun in the eleventh century, the original idea of it being given by the architect Geber, a native of Seville, to whom the invention of algebra is attributed; and also the design of two other similar towers, one in Morocco, and the other at Rabata. The tower of which we are now speaking was at first two hundred and fifty feet high and fifty feet wide, and was without diminution as it rose. The walls are eight feet thick, of squared stone from the level of the pavement; the rest, for eighty-seven feet, is of brick. In the centre of this tower is a smaller one, the interval between the two towers being twenty-three feet, which serves for the ascent, one so convenient that two persons abreast can mount it on horseback. The central tower does not diminish; but as the edifice rises in height the walls gather over, so as to allow the passage of only one person. Upon the Moors of Seville negotiating their surrender, one of the conditions of it was that this tower should not be destroyed; to which Don Alphonso, the eldest son of the king, answered that if a portion of it were touched not a man in Seville should survive. In the earthquake of 1395 it was partially injured, and remained in the state of misfortune that then occurred until 1568, when, by the authorities, Ferdinando Ruiz received the commission to raise it one hundred feet higher. This height he divided into three parts, crowning it with a small cupola or lantern. The first division of his addition is of equal thickness with the tower on a plinth, whence six pilasters rise on each façade, between which are five windows, over which is an entablature surmounted by balustrades; the second is lower, with the same ornament; and the third is octagonal with pilasters, over which the cupola rises, crowned with a bronze statue of Faith, vulgarly called La Giralda." This statue, although it is fourteen feet high and weighs two thousand eight hundred pounds, is a weathercock, and veers with the lightest breezes.

HOUSE AT OYSTER BAY, LONG ISLAND, N. Y. MESSRS. POTTER AND ROBERTSON, ARCHITECTS, NEW YORK.

EPSILON CHAPTER HOUSE OF THE DELTA PSI FRATERNITY, TRINITY COLLEGE, HARTFORD, CONN. MR. J. CLEVELAND CADY, ARCHITECT.

Extreme width and length sixty by fifty feet. Tower, something over one hundred feet in height. Material (including cornices, etc.), New Hampshire granite. The situation near the colleges commands a view of the Connecticut River and Farmington River and valleys, a circuit of some forty miles.

ARTIST BIOGRAPHIES.[1]

In these days the conditions for a healthy development of art must involve a knowledge of its past, of its greatest masters, of their greatest achievements, and under what circumstances these achievements were rendered possible; for we very well understand that there can be no art commensurate with the attainments of the nineteenth century in science and literature without some intelligent comprehension of the history of art, at least in its outlines, not by artists alone, but by the public through whom they must live. In our own country, where, notwithstanding its wealth and enterprise, there is existing, out of the countless pictures by the old masters, scarcely a single authentic example, this desire to know and comprehend the great precedents of art is almost pathetic. The less expensive autotype processes of reproduction, the heliotype and the photograph, are doing something to meet the emergency, and the drawings of the masters are already becoming familiar to those who care to know them; but of course the questions of color, of chiaroscuro, and of the technical qualities generally must remain a dream of possibilities or probabilities; most of us must be content with getting them at second or third hand in some more or less irregular fashion, by dim copies and by dimmer reflections in the works of modern artists, produced in the atmosphere and under the impulse of the great galleries of Europe.

To us, therefore, so ill furnished with the inspiration of high example, the literature of art becomes a more important element of knowledge than to others more happily placed, and the eagerness with which cheap books on the subject are purchased is a pretty fair indication that the interest is genuine. Conspicuous among these, and admirably contrived to suit our conditions, are the biographies of the great masters, issued in an inexpensive and uniform series by Messrs. Houghton, Osgood & Co. This series comprises the lives of Titian, Michel Angelo, Raphael, Fra Angelico, Dürer, Murillo, Rembrandt, Claude, Guido, Leonardo da Vinci, Van Dyck, Sir Joshua Reynolds, Turner, Landseer, and Allston. These appear in separate volumes of about one hundred and fifty pages each, and contain all that the general student needs to know of the persons through whom, by the will of God, since the Renaissance of classic learning, the arts of painting and sculpture have been transmitted to modern times and have taken their present form.

Around most of these famous lives tradition, commentary, and conjecture have woven a veil through which the modern eye finds it hard to pierce to the truth, unless assisted by some such intelligence, trained in literary labor and animated by a love for art, as the author of these books, Mr. M. F. Sweetser, has amply evinced. Moreover, the standard lives of the masters, which are the result of the most diligent search, and in which are gathered together all that history has directly or indirectly revealed to modern times in regard to the subjects, are for the most part voluminous and costly works, to be found only in the libraries of specialists. On the other hand, the sketches in the encyclopædias and biographical dictionaries are mere perfunctory outlines, and for the most part take up the familiar traditions and fables without emendation. Other great names, like those of Guido, Claude, and Murillo, founders of schools, the influence of which has been directly felt in all subsequent art, have never received the honor of biography in any distinct form, at least in English. By a strange fate it seems to have been reserved for the author of these modest little books to be the first to present in our own tongue the stories of these three masters, a knowledge of which is so essential to the popular comprehension of the history of art.

It is, therefore, no superfluous contribution to the literature of art thus to revive for popular use the memories of these great characters. The series is very neat and attractive in form; each volume may be comfortably and profitably read in a couple of evenings. In each have been carefully collected, from the most trustworthy authorities near and remote, all the authentic facts and all the best general criticisms which have appeared in any language, and each leaves upon the mind a distinct, concrete impression of a man of men. To the reader the result must be a far more intelligent comprehension of historic art, and a greater and more worthy respect for that prolific sort of genius which can not only add to the happiness and delight of mankind and make life the better worth living, but can teach how more profitably to enjoy and understand the beautiful things in nature. We have carefully examined and compared these little volumes, and find that within their narrow compass not only the essential facts have been carefully set down, but that in each case the idle tales which, by a curious fortune, have survived as a part of the picturesque story of the lives of the masters, have been rejected, and that many new facts which have been revealed to the judicial and industrious investigation of modern literature take their due and fitting place in the narrative. But Mr. Sweetser has exhibited not only an industry fruitful in results, but an ability to draw fresh conclusions. Thus he shows, with regard to the brilliant and eccentric Guido, so little known to us as a personality, that the well-known picture called the "Beatrice Cenci" is probably no portrait of that unhappy maiden, and that it is not a work

[1] Artist Biographies. Boston: Houghton, Osgood & Co. 1878 and 1879.

of this master; the dark cloud over the fame of Rembrandt is in a great degree dispelled; Murillo is no longer the shadow of a name, but a master, who, following Fra Angelico, stood almost alone, among his contemporaries, as a painter of serious Christian art without taint of the universal paganism which beset the inspirations of his time, a master who prayed as he painted, and painted as he prayed; Turner, with the assistance of Hamerton and other modern investigators, is relieved of the overweight of Ruskin's magnificent eulogies, but still retains his due position of mastery in modern landscape art; Claude is shown as a careful student of nature and not merely a composer of pompous landscape effects with classic episodes going on in the foreground; our own Allston, in an extremely well written narrative, is elevated to his proper place in the Valhalla; and in short all these fruitful lives are rehabilitated in the spirit of truth and relieved from the factitious atmosphere of romance which imagination has been fond of drawing around them, and from the reproaches and misconceptions to which ardent critics have subjected them that their own ideas might have the better chance of life.

These librettos enjoy the advantage of having been written not by a schoolman in the interest of any especial set of theories, or by an artist in the service of any especial school of art, whether pre-Raphaelite or post-Raphaelite, whether Italian, Spanish, German, or English, but by an American scholar with a genuine respect for art, and concerned only to get at and duly set forth the whole truth. Each book is preceded by a preface indicating the principal sources of information, and serving as a sort of bibliography of the subject, and concludes with a list of all the known works of the artist and their present places of deposit so far as they are known. The limitations of space confine the writer to a narrative often condensed, and intense in interest by reason of its abundant incidents, but never crowd out what it is well for us to know of the testimony of the greatest critics with regard to the peculiar character of the genius exhibited in each life. The uniform character of the books subjects the writer at first sight to the charge of book-making, of adjusting facts, in Procrustean fashion, to the publishers' limits of space; but the work is really done in a workmanlike manner and with a certain judicial partiality and completeness which are deserving of praise. It must be confessed, however, that the limitations of these books with regard to number seems arbitrary; for a scheme which admits Landseer and Allston of modern artists, but takes no note of any of the great French leaders, whose characteristics are really exercising more influence over art in these days than those of any other set of men, — a scheme which does not include such distinct masters in art as Rubens, Delacroix, Delaroche, Hallsein, Teniers, and Gainsborough, — is wanting in completeness. Let us, however, hope that the publishers may be encouraged to make this interesting and useful series more complete in the immediate future; we commend what has already been done very heartily to all who would furnish their minds with a fuller knowledge of the great achievements in art.

CORRESPONDENCE.

FRENCH FURNITURE AT THE EXHIBITION. — TAPESTRY. — FAÏENCE. — STAINED GLASS.

PARIS.

In my last letter I criticised the English furniture in the Exhibition as showing great skill in cabinet-making, but offering little beyond that; still, as joinery is the anatomy, so to speak, of furniture, it is an excellent foundation for the latter in its broadest sense, where it includes the application of various arts, indeed so overlapping it as to form a neutral zone in which it is difficult to determine whether an object is a bit of furniture or a pure work of art, as is the case with sculpture in mantel-pieces and bas-reliefs, finely worked bronzes, faïences, tapestries, etc., employed where use and ornament are combined. It is into this wide domain of *mobilier* — which thus includes more than our word furniture — one enters as he looks down the long vista of drawing-rooms and boudoirs which chiefly fill the French furniture gallery. One's attention is at once drawn to an endless variety of sumptuous sofas, divans, tête-à-têtes and arm-chairs, poufs and other pieces, so thoroughly French that I doubt if we have ever found English equivalents for their names, and all these, as well as rich curtains and *portières* draped with consummate art, charm the eye by the exquisite taste with which the tints of costly fabrics have been harmonized and contrasted. It is a feast of color worthy of the old Venetians, from whose pictures many a rich tone has been copied. One is not surprised, then, to come upon some well-known painter lingering with half-closed eyes before some clever scheme of color; for good as the color of French painters generally is, there seems to me a deeper instinct shown for rich and brilliant harmonies here than is to be found on the walls of the annual *Salon*. It is curious to note that there seems no prevailing fashion in the tints or their combinations. New shades are of course discovered every year, and the later ones show the influence of the bric-à-brac mania, which, as in recent paintings, shows itself in the use of rich brocades and heavy embroidery, and in some lovely faded shades of velvet, pale amber, soft mouse-color, dusky maroon, etc.; but then beside these would be the deepest tones of rich color, so it cannot be said that even these new tints especially are the fashion.

The most admired and conspicuous interior is a wonderfully beautiful boudoir. An immense velvet curtain of a strange but lovely dark blue-green is draped in magnificent folds, here and there revealing inner draperies of pale coffee-color and light blue silk, over a splendid gilt couch covered with the palest rose satin; a deeper rose drapery is arranged behind it, and a white satin coverlet, embroidered in strong colors, is thrown in careless folds across the foot. Behind the couch on the wall is a metallic blue and buff satin, and in the back ground is a large tapestry picture of nymph and cupids, with prevailing tints of pale pink and primrose, while in the foreground stands a bright garnet seat and a picture on a draped easel; on the dark garnet carpet near the couch is a gilt stand on a tiger skin, and these with a large alabaster pot of palms complete a picture extraordinary for masterly simplicity and beauty of color. Of course words are hardly less impotent to convey an idea of harmonies of color than they are in the case of those of music, and I give this description to show how few objects finally composed an exhibition to which months of study and experiment must have been devoted. An exhibition so far removed from a mere commercial display shows how high into the regions of pure art furniture may be carried. This exhibit was rewarded by a gold medal and a decoration. Gold medals were also awarded to Beurdeley, Meynard, Sauvrezy, Quignon, all well-known men. But it must not be thought that only upholstery is exhibited, for there is a perfect museum of everything which is best in French furniture since the sixteenth century, when Italian art, led by Leonardo da Vinci himself, received a hospitable welcome to Paris, and the imitations of the ebony work inlaid with ivory then imported may be here compared with the identical work continued in Northern Italy, and now an important manufacture of Milan. So also the modern Florentine *pietra dura* inlaying is confronted with reproductions of Louis XIII.'s time. French furniture, however, became thoroughly national under Louis XIV., when Boule invented a variety of inlaid and *appliqué* ornaments, which were pushed to the fantastic during the succeeding reign. Side by side with these large cabinets and heavy tables are the delicate and refined secretaries and work-stands of Louis XVI., where classic taste insisted on lightness and simplicity of form, and twisted spider legs gave way to slender colonnettes, while the ornamentation was confined chiefly to inlaid brass. There are fine examples of carved wood, but nothing Gothic, chiefly Renaissance cabinets, where the extreme delicacy of the carving, or rather of the engraving, is shown off by the highest polish. In these, as in all the previous examples, the workmanship in the various arts employed is beyond criticism, and the working out of the details shows the highest art; but what shall be said of the designs in general? "*Toujours les mêmes documents*" was the remark of a Frenchman, and it is a fair criticism. Since the first empire the French have been chiefly occupied in adapting to modern wants historical examples, and perfecting their imitation, and this reached its culmination in the Exhibition of 1867. Excepting progress made in coloring and upholstery, and an advance in skilled bronze work, at the head of which stands M. Barbadienne, this department of French art has gained nothing, and apparently sought nothing, since the last exhibition. To be thus stationary for long can but lead to a decadence. This danger is appreciated, however, and vigorous efforts doubtless will be made to throw new life into this department. The recent association formed under the auspices of distinguished artists and amateurs for the promotion of decorative art promises to give the needed impulse and awaken interest in these matters. A Museum of Decorative Art is to be opened shortly in the Pavillon de Flore, with both permanent and loaned specimens. I noticed that numerous examples of English faïence had been purchased for this museum, which is a deserved compliment to England.

It is, in fact, from England that the idea of this new museum has come. Imitating some of the functions of the South Kensington Museum, it will organize from time to time exhibitions which will make the tour of the provinces, besides establishing in the principal cities permanent branch museums, well supplied with casts, models, etc. For some time the French have felt that, in spite of the technical skill of the workmen, their decorative art was not what it should be, and needed to be pruned and remodelled in various ways. The rapid progress England has lately made, especially in the ceramic arts, has confirmed this uneasiness, and roused them to preserve their ancient supremacy.

This supremacy, however, never seemed more inapproachable than in their exhibition of the national Gobelins and Beauvais tapestries. From the Gobelins works come two immense carpets of Savonnerie work for the Palace of Fontainebleau, besides allegorical panels and several wonderful copies of old masters. In all these examples the shading and soft blending of tints are marvellous. The Beauvais work is represented only by panels of fruits and flowers, but they too are perfect in their way. Not only has France distanced during the three centuries of these manufactures all former foreign competitors, — the present exhibition of the Flanders tapestries, once so famous, measures that distance, — but no private works have ever been able to compete with them in this long and difficult process. Now, however, M. Cluis has invented a different and shorter system, which consists in coloring the threads when in place, instead of laboriously working out the design with the previously dyed threads. If he really can dye and fix the tints in this way it will enable the artist to work himself upon the tapestry, but it is doubtful whether this can be done, and still more so whether the effect of the present Gobelins could be given.

Although the exhibition of the Sèvres works is very complete, and contains as beautiful specimens in form and color as ever, it does not, as with the tapestries, thus stand alone; for though no other works can produce vases of such exquisite designs, private enterprise is pressing nearer to its perfections, and in the matter of mere coloring can almost rival it in the simpler and smaller pieces. These private manufactories are scattered over France, Limoges taking the lead with a fine school she has lately established to train her workmen, who include most of the inhabitants. This porcelain is generally white with delicate colored designs. From Rouen comes the well-known blue china; from Nevers the tint is usually gold or yellow; while quaint old Bourges sends designs as quaint as herself, with flowers and queer monsters.

Ancient as are these establishments and their advantages, England with her new manufactories fairly rivals them in certain things, and Doulton's exhibition, as well as Maw's and Minton's and the Worcester Works, contained specimens in some ways superior. The English tiles were in general better than anything French of the kind, and attracted much attention. One reason of this may be that in tiles it is particularly essential that the design should never destroy the sentiment of a flat surface, which secret I believe lies at the bottom of the recent improvement of the English in decorative design, and of which the French too often lose sight; for the recognition of the surface to be decorated is essential to good design. The English coloring was unexpectedly beautiful, and had the forms of their vases been as graceful as were the shapes of Mr. Webb's wonderful glass show (*grand prix*), their success would have been unqualified. There is another department of art in which the English were unrivalled; the strength and delicacy of the wood-cuts exhibited by the London *Graphic* surpass those of any other paper, and the best Continental work appears coarse and stiff beside it. There was a large collection of the original sketches from their Russian war correspondents, which showed from what meagre data their fine illustrations are worked up by home artists.

The exhibition of stained glass was one of the unsatisfactory things of the Exhibition. Among the large number of French exhibitors there was little pure and rich toned glass. The small, finely-pencilled heraldic panes and engraved, tinted glass were perfect in their way, but nothing which showed serious approach either to the clear, simple colors of the thirteenth century style, or to the deeper tones and more picturesque compositions of the succeeding styles. M. Oudinot, who has sent a number of windows to America, notably to Trinity Church, Boston, received a gold medal, and his certainly were among the best examples; but though the drawing is fine, and the coloring agreeable, his glass does not have the clear, pure tone which gives the luminous breadth to old glass. Generally the best glass in France is done by workers in the cathedral towns, where having studied patiently the native glass they will repair or imitate it with skill, but given an original design they lose breadth and purity in futile details. Lorin, of Chartres, showed noticeably these virtues and defects. Although I looked in vain for Clayton and Bell, whom I believe superior to any Continental manufacturers, the English glass seemed nearer to the mediæval models in breadth and purity, though here too there is a tendency towards and confuse by shading. Among the English makers I noted Radcliff & Co., Ward Hughes, John Hardman. A gold medal was given to extremely delicately-pencilled panes for dwellings by Cumm Brothers. R.

MODEL-TENEMENT COMPETITION.

New York.

A very interesting attempt has been started by the editor of the *Plumber and Sanitary Engineer* in offering a prize for the best design for a New York tenement house to cover a lot twenty-five by one hundred feet. In association with D. Willis James, F. B. Thurber, Henry E. Pellew, and Robert Gordon the editor has provided a purse of five hundred dollars as an inducement for the architects to prepare designs. The conditions suppose a lot inclosed on sides and rear by buildings of adjoining lots, so that little or no aid from side or rear openings can be looked for in securing ventilation and light. The investigations which have been made of late into the horrors of the tenement house system have shown the need of reform, and, probably, the fact that dividends from this class of property are falling away has induced the real estate owners named above to take part in the offer. They have selected a committee of award consisting of R. G. Hatfield, architect; Prof. Charles F. Chandler of Columbia College, and the President of the Board of Health; Rev. Henry C. Potter of Grace Church; Rev. John Hall of the Fifth Avenue Presbyterian Church; and Robert Hoe, the head of the press works and machine shop. The workmen in the establishment of the last named gentleman have been discussing the project for some time past, and at several meetings held on the subject of improved dwellings have appointed committees of investigation from among their own number. The points to be particularly looked at by the committee in fixing the points for the several designs are: (1) security against conflagration (including fire-proof stair-cases open to the air); (2) distribution of light; (3) ventilation; (4) drainage, and other sanitary appointments; (5) seclusion of each suite of rooms, and publicity of access to them; (6) convenience of arrangement; (7) inexpensiveness. Sufficient drawings in line to show the general features, with such detail drawing as will exemplify any peculiar features, will be required, all to be done in India ink without color or washes.

The drawings are to be accompanied by a concise, clear description of the arrangements and materials of construction, together with a detailed estimate of the cost of construction, which is to comprise masonry work, cut-stone and plastering, iron work, carpenter work, roofing and painting, plumbing work, sanitary appointments, and other required work and materials, and contingent expenses required to render the building ready for occupancy. The estimate to be given for each of the kinds of work above named separately. The estimates to be made in good faith from trustworthy data, the prices those ruling in the city in which the design is made, and the name of the city given.

The motto plan will be adopted to prevent the committee of awards from knowing the names of the several authors of designs. The closing hour is fixed for two P. M. on the 4th of February, 1879, and the committee of award will on or before the 18th of February give an opinion, numbering the designs from one to the highest number received in the order of their merit. From February 5 to February 15 the designs will be on public exhibition.

To the author of the design "No. 1" will be paid $250; to the author of design "No. 2" will be paid $125; to the author of design "No. 3" will be paid $75; and to the author of design "No. 4" will be paid $50. The designs will all be returned to the authors, or mailed to their address.

In all this competition there is no distinct provision that the houses shall possess any distinct architectural merit. This is left, if it is to be looked after at all, to the architects personally, but in securing the several points laid down, a barn, fulfilling the requisites of physical ends laid down, must take the first prize be it as devoid of beauty as a rebuilt factory.

Many architects declare that the idea of attempting anything of this sort within the narrow limits of a city lot is sure to end in failure, and point to the blocks built for Alfred T. White, in Hicks Street, Brooklyn, as meeting the problem of a model tenement. The first block was opened February 1, 1875, and since that date the same plan has been carried out in two larger blocks. Mr. White estimates from his experience that a return of seven per cent net upon the capital invested might be realized upon land in this city, supposing the land to cost $5,000 per lot and the cost of building to be the same as in Brooklyn. But in this competition the conditions are purposely narrowed to single lots in an endeavor to see if they, too, cannot be made profitable and yet supply tenements fit to live in.

W.

NOTES AND CLIPPINGS.

We wish to draw attention to a change in the publishers' advertisement on page vi. of the advertising pages, where it is stated that the numbers of this journal for November and December, 1878, will be given, gratis, to new subscribers who pay their subscription for the ensuing year before December 25, 1878, instead of December 15, as hitherto stated.

We wish also to draw attention to the prospectus for the ensuing year, and to the new and enlarged premium list, which we have tried to make attractive and useful, which will be seen on the following page.

Building Law.—A case was decided lately by Judge Yaple of the Superior Court of Cincinnati, that may be of interest to our readers. It seems that the firm of Louis Stix and Company, owners, contracted with M. Marcus, principal contractor, for the carpenter work of a store building. Stix and Company paid Marcus amounts from time to time upon the estimates of the architect, according to contract, up to a certain time, when Marcus made an assignment. After this assignment was made Stix and Company paid or rather advanced Marcus $1,500 without any estimate from and contrary to the advice (so the prosecution stated) of the architect. Messrs. Mitchel and Rowland, and Greenlees Ransom and Company, bring suit under the lien law to recover the amounts due them, and hold that the $1,500 was not legally paid to Marcus. The court held that the money was not illegally paid, and that the owner had the right to do better for the contractor than his contract called for, and gave judgment for the defence.

Architectural Reverses.—Messrs. Hodgson and Brown, architects, of Indianapolis, Ind., and Mr. Charles Craysey, architect, of Cincinnati, have been appointed by the County Commissioners of Vigo County, Indiana, to examine and report upon a set of plans prepared in 1872, by J. A. Vrydagh, architect, for the Court House it was then proposed to erect. It seems that Mr. Vrydagh's plans were prepared and adopted and bids tendered, when at this state of the case a committee appointed by the citizens vetoed the whole matter, for what reason is not known to our correspondent. Mr. Vrydagh thereupon entered suit for $15,000, and this commission of architects is appointed to report as to whether that is a proper amount to pay an architect for plans of a building that was to have cost about $300,000; the commission is also to report whether the building could have been built for that sum according to the plans. The commission commenced its sessions at Terre Haute, Ind., on the 17th inst., and will continue until its labors are completed.

Aneroid Barometers.—The Giffard Captive Balloon, at Paris, has, it seems, been made to serve for some interesting experiments with aneroid barometers. It was discovered that all, or nearly all the barometers, after registering the ascent, failed to record the difference in altitude until some time after they had been returned to the earth.

Hardening Copper.—Dr. J. S. Mayer, of Virginia City, Nevada, claims that he has discovered the lost art known to the ancient Egyptians, of tempering copper so as to produce an edge which will cut like steel.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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CONTENTS.

SUMMARY:—
St. Alban's Abbey Church. — Architects against Restorers. — A new Turner. — Underground Telegraph Lines in New York. — Building in Brooklyn. — The Labor Troubles. — Strikes and Labor Statistics 209
THE OPEN FIRE-PLACE. V. 210
HOUSE DRAINAGE IN PHILADELPHIA 212
THE ILLUSTRATIONS:—
The Salisbury Building. — House at Winchester, Mass. — St. Paul's Church, Harrisburg, Pa. — Interior of the Church of St. Lambert, Münster, Westphalia 213
BOOK NOTICES:—
Vose's Geometrical Drawing — The Old House Altered . . 213
REPORT OF THE COMMITTEE ON NATIONAL SURVEYS 214
THE ASSYRIAN GATES 215
COMPETITIONS IN INTERIOR DECORATION 215
BOOKS RECEIVED 216
NOTES AND CLIPPINGS 216

A WARM controversy is going on in England over the proposed continuation of the restorations of the famous Abbey Church of St. Alban's. We gave, some time ago (*American Architect*, May 25, 1878), an account of the ingenious method adopted for restoring the warped walls of the nave to their upright position. The church is one of the most interesting in England, being the largest not a cathedral — ranking in length with Winchester, Canterbury, and Ely — and having the remnants of one of the finest as well as one of the earliest Norman naves that exist. The restoration was in the hands of Sir Gilbert Scott, and it is possible that if he had lived the controversy would never have arisen. If our readers will look back to two of Mr. Neale's plates of this building, which we copied from the *Architect* (*American Architect*, June 29, 1878), they will see that a noble tower and transepts of Norman work are conjoined with an eastern arm of early English and decorated work, the whole much bedevilled — if we can be forgiven the word — by battlemented parapets and traceries of various periods. All four arms of the church originally wore high-pitched roofs; and our plate of the exterior shows clearly some of the channels of the old roof lines, which exist on all sides of the central tower. The transept fronts also retain the springings of the original gables, with remains of a blank arcade which crossed the gables at their feet, things not visible, however, in our plate. All the old roofs have been replaced with flat roofs of very low pitch, put on, probably, in the Perpendicular period, when the parapets were added which hide them. The interior view that we gave shows only the three westernmost bays of the nave, which are early English, there being nine bays of the Norman work still left on the north side, and fewer on the south. Over this nave the low-pitched roof carries a flat ceiling, which, with the roof, is in a very dilapidated condition. Here is the bone of contention. The committee in charge of the restorations have declared that the present roof of the nave is ruinous, and propose to replace it by a roof following the lines of the old weathering in the tower. The Society of Antiquaries and many of the leading architects, as well as most of the architectural journals, have united in protesting against this project, and the Institute was, at the last account, apparently getting ready to enter the lists.

THE curious thing in the controversy is, that it is the architects — representatives of the profession abhorred by the conservators of old architecture, the profession whose zeal for restoration has brought down the anathemas of those who revere old work — that have intervened to keep things as they are by simply repairing the existing roof; while the chief of the party that, in the true spirit of modern restoration, would substitute what they think should have been and must have been for what they find, is — who but Sir Edmund Beckett himself, whose services in the diocese of York we mentioned last week? Sir Gilbert Scott had decided that the present roof could be repaired to advantage. He believed that the removal of the high-pitched roofs had injured the appearance of the church, but that the difficulties in the way of a return to them were too formidable. Mr. Street, with Mr. Christian, Mr. Neale, and others, has examined the roof, and has reported that, although he can make out with certainty the form and construction of the original roof, the present one can be and ought to be repaired. It is evident that the real quarrel is not over the condition of the roof, but between a desire to preserve it and a desire to replace it. The opponents of "restoration" argue that to replace the roof means ultimately to reroof the whole building, rebuild the gables of the transepts, and replace the western front. The significant point is the change of position on the restoration question that the quarrel indicates. A few years ago no conscientious restoring architect would have hesitated to pull away the later work, roof, parapet, and battlements, which he would have considered to be simply a disfigurement of the older and purer portions, and to bring the whole back to what he would have considered its original likeness. It is not very long since the Royal Institute, in its published recommendations for restoration and conservation, urged that it should be a main object in restoring "to get rid of modern additions put up without regard to architectural propriety," and that therefore the low roofs added in the Perpendicular period should be replaced by steep ones like their predecessors. It is but little more than a year since Mr. Stevenson, in a sharp onslaught on restorers in presence of the Institute, attacked both Sir Gilbert Scott and Mr. Street for making this very change. To-day we find Mr. Street protesting against a similar change, and citing Sir Gilbert's opinion against it, while the committee in charge of the most important unrestored building in the kingdom is urging it. And we find Sir Edmund Beckett, the amateur corrector of architects, boldly affronting, with the zeal of a catechumen, the difficulties which Sir Gilbert found "too formidable."

IT is not known that more than three or four of Turner's pictures have ever been brought to the United States. Those have been in private collections where they were not accessible to the public. One of them, of high reputation, has been in the hands of a collector who has persistently refused to let any one see it. The only one that has been generally known is the Slave Ship, now in the Museum of Fine Arts in Boston. Mr. Thomas Moran now claims to have discovered one that has lain *perdu* in the country for a quarter of a century. It is a picture of Conway Castle, a famous castle in North Wales, built by Edward First, of which Turner is known to have made several drawings — water-colors and others. This particular picture seems to have passed out of the notice of Turner's admirers. It has not been mentioned by Mr. Ruskin, we think, nor is it named in the voluminous lists of Turner's works given by Mr. Thornbury in his biography. It was not exhibited by Turner either at the Royal Academy or at the British Institution; and, rather curiously, since the subject seems to have been a favorite one with Turner, none of his drawings of it have been engraved, if we can trust Mr. Stokes's catalogue of the engraved works. Mr. Moran, however, has found a very direct and straightforward history for his picture. It was painted, he says, in or near 1810, for Mr. Thomas Goodall, banker, of Abingdon, Berkshire, England, and after his death came into the possession of Mr. John Butterton of Staffordshire. His son of the same name, an artist, inherited the picture and brought it twenty-five years ago to Philadelphia. There Mr. Moran, being then a boy, saw it, and he has treasured it in his memory ever since. Lately he got track of it again by means of an advertisement in *Scribner's Monthly*, so the story goes. Finding it and Mr. Butterton in Hammonton, New Jersey, he secured it. It is larger than the Slave Ship, being three feet eight inches by four feet eight inches. He is reported to value it at from twenty-five to thirty thousand dollars. This seems rather an enthusiastic valuation of an obscure work of Turner's early period, considering that the highest price ever paid for a Turner was five thousand guineas, and that only three or four have ever brought more than three thousand. What Mr. Moran's purchasing price was we are not told.

A NEW proposition for burrowing under ground in the streets of New York is that of the company which has just procured an ordinance allowing it to lay "subterranean telegraph wires and electric conductors" in the streets. These are, by the terms of the ordinance, to be laid under the direction of the Commissioners of Public Works, in trenches not more than two feet wide and two feet deep, and four feet from the curb-stones, so as not

to interfere with gas and water mains, or with sewers. It is proposed to inclose a bundle of copper wires in an iron pipe, first separating them by wrapping each with cloth, and then to complete the insulation by pouring in melted paraffine. The purpose of the company that is to lay these wires is obviously to offer them as a substitute for the wires that are carried on poles and through the air; possibly to enforce their offer by a little municipal persuasion, and even with an eye to the ultimate use of the electric light. The Union Telegraph Company, which has a large amount of money invested in street poles and elevated wires, does not favor the scheme; but maintains that the underground wires would be more likely to get out of order, which does not look plausible, and more difficult to repair, which is plausible, and that the next move of the new company will be to press an ordinance banishing the poles from the streets, so as to bring their wires into demand. Whatever may be the convenience of the telegraph companies, there is no doubt that the poles and air-wires are an annoyance as well as a disfigurement in the streets. The poles carry anywhere from a dozen wires to a hundred, which occasionally break, or are blown down together by a gale, and are in that condition of no use to the companies, but extremely obnoxious to passengers. In London and Paris the underground railways and sewer tunnels give an opportunity to relieve the streets by carrying telegraph wires as well as the gas and water pipes where they are at once out of the way and accessible. Here is another argument for introducing sub-ways under our streets where it is practicable, and for wasting no more money in putting them off. If the city of New York, instead of requiring every new company that wishes to disturb the streets to pay for its franchise, as seems now to be the pet idea of municipal thrift, should require them all to bear their part in building sub-ways, perhaps something might be done.

The Chief of the Brooklyn Department of Fire and Buildings, Mr. Williams, presents a list of building-permits issued during eleven months of 1878, which shows that the amount of work reported to his department does not differ much from the average of the last four years. The whole number of permits is given by the Brooklyn *Eagle* in one table as 1638, and in another as 1738. The estimated cost of the work is set at $6,525,742. Among these buildings are 832 single dwelling-houses, 213 for two or four families each, 255 shops and dwellings combined, and 15 tenement houses. There were six churches, 21 factories, seven school-houses, six railway stations, one observatory, and one distillery; 1,086 are set down as brick buildings, and 652 as wooden. The numbers and cost reported for the last five years, but for twelve months against eleven in 1878, are: in 1873, the year of the panic, 307 buildings, costing $1,685,600; in 1874, 1344, costing $7,773,500,—an extraordinary increase; in 1875, 1648, costing $7,710,000; in 1876, 1743, costing $8,165,300; and in 1877, 1686, costing $7,000,000. The growth and decline of tenement-house building is noticeably illustrated in that there are reported in 1873, six; in 1874, 81; in 1875, 113; in 1876, 124; in 1877, 60; in 1878, 45. This may be assumed to indicate the sudden demand for such houses which the pressure of hard times has developed, and the approximate satisfaction of the demand. In the same years the numbers of private houses permitted were 160, 639, 751, 843, 887, 832. Some suggestion of the relative prosperity of mechanical employments may be inferred from the numbers of workshops reported: two, 37, 33, 47, 80, 70.

The long disturbances of the labor market, here and abroad, do not seem likely to come to an end. There is no great reason to expect that they will so long as business depression and falling prices continue. It is the stumbling-block of the workingmen that they do not feel such depression by direct contact, but only through their employers, and they are therefore tempted not only to resist by force their share of the general burden, but to visit upon their employers the injuries which are only the transmitted shocks of a universal disturbance. Mr. Bishop, of Pittsburgh, touched upon a like difficulty in saying before Mr. Hewitt's Labor Committee that the greatest cause of discontent among workingmen at present is that they do not realize that prices fall with wages. The condition of England is particularly unsettled. The workmen in the building-trades, among whom there has been a pretty general reduction of wages of late, have not yet shown a disposition to renew their strikes. The iron-workers of Staffordshire have found it necessary to reduce their wages, and one of the largest companies, the New British Iron Company, has decided to shut down the greater part of its works. The twelve or fifteen thousand cotton hands who have been on strikes at Oldham hold out with pertinacity, except a few who have gone to work provisionally, pending the discussion of a settlement. The cost of the strike to the workmen during the first four weeks is estimated at $500,000.

The weakest phase of the workingman's position was shown in the recent strike of car-drivers in New York, where the refusal of the Third Avenue horse-railroad to take on two men who had been prominent in a previous contest led to a general strike. The company's firmness and the fact that plenty of new men could be had have enabled it to keep the upper hand. Probably there is no field on which the general question of strikes can be fought out with so little ultimate advantage to the workingman as on the railroads, or like public services, for there is none in which the public is so sure to be enlisted against them. In other businesses the community feels the injurious effect of strikes only indirectly, in the general depression of the businesses and the disturbance of prices; but here the immediate injury is so direct and serious that the public is aroused at once to oppose the strikers. We notice, on the other hand, as a step in the right direction, the petition of the workingmen of Missouri that their legislature should establish a Bureau of Statistics of Labor; which, however, is at once discredited, and reduced to a piece of class legislation, by the provision that the Commissioner shall be a "*bona fide* representative workingman."

THE OPEN FIRE-PLACE. V.

In its primitive form it consisted of a simple niche cut in the thickness of the wall, the sides terminating in small piers supporting the massive head as shown in perspective view by Fig. 17, from Viollet-le-Duc. The oldest fire-places of the Middle Ages were

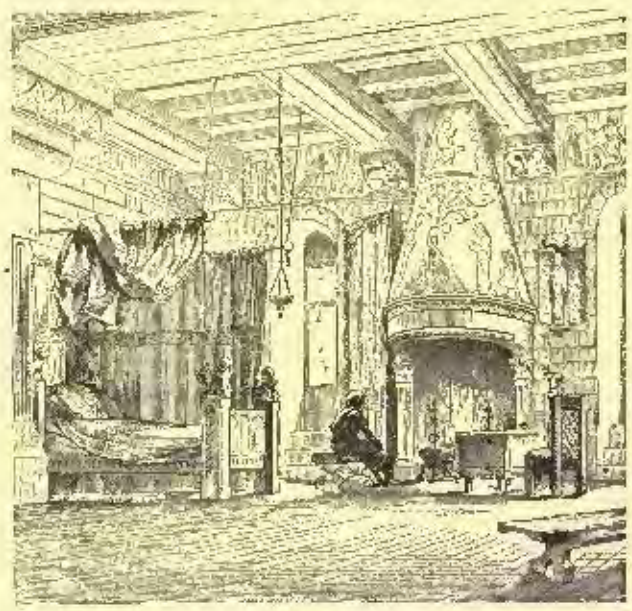


Fig. 17.

often circular in plan, the back of the fire-place forming one segment of the circle, and the mantel and hood the other. Those supposed to be of the twelfth century were not so large as those of a century later, and the mantel was apt to be formed of a single piece or of two pieces of material, as in that of the Cathedral of Puy en Velay, shown above, or in that of the private house in the old town of Cluny, France, represented in Fig. 18. Here the hood is supported by a single curved timber. In this example the entire thickness of the wall is used, the back of the fire-place being on a line with the outside of the wall, so that the masonry of the chimney shows in projection on the exterior. The hood is elliptical and resolves itself, as it ascends, into a circular flue. On the right and left are little shelves for lamps, corresponding to our modern gas-burners on the chimney breast. The low windows near the fire-place enabled the occupants to see what was going on in the street while they sat by the fire.

Fig. 19 represents the old fire-place in Roslin Castle, of colossal dimensions and extreme simplicity of design. In these great fire-places huge trunks of trees six or eight feet long were sometimes burned. Seats were placed on and about the hearth, and the screens and jambs of the fire-place formed together a complete antechamber as it were, apart from the large halls in which they were built, and

here the family united to pass the long winter evenings and listen to the famous legends of olden times.

Fig. 18. Fire-place in the Villa de Cluny, Rue d'Avril, No. 13. From Viollet-le-Duc.

After the thirteenth century the kitchen, forming part of the main house, and no longer a separate establishment in which whole sheep

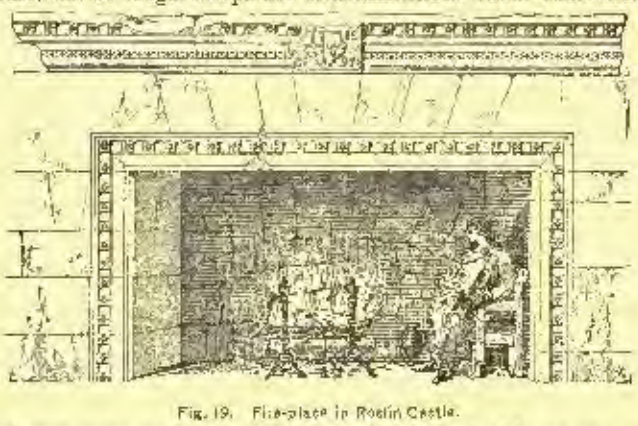


Fig. 19. Fire-place in Roslin Castle.

and oxen were cooked at one time, was furnished with one or more of these massive fire-places, of which Fig. 20 furnishes a beautiful

Fig. 20. Kitchen Fire-place of Granite. From Viollet-le-Duc.

example. It belonged to the Abbey Blanche de Mortain, was built of granite, and still bears the arms of the abbey and the triple pot-hanger with the iron plate behind the fuel.

Here we have no piers at all, the hood resting on heavy corbels of granite, and the fire-place is built as usual in the thickness of the wall.

Up to the fourteenth century the fire-places of private houses and

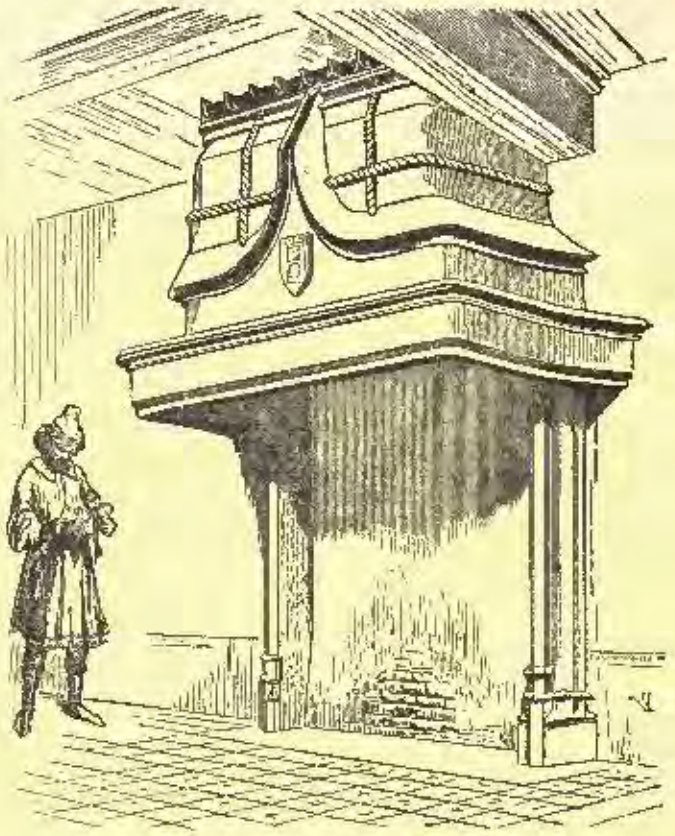


Fig. 21. From Viollet-le-Duc.

chateaux were generally of great simplicity, and it was only later that we see any attempt at decoration.

Figs. 21 and 22 represent two fire-places of the fifteenth century, with jambs of stone and hoods of wood plastered and curiously decorated. They are in the little town of Saint Antonin (Tarn-et-Garonne).

Fig. 23 gives a section of the first fire-place, showing the construc-

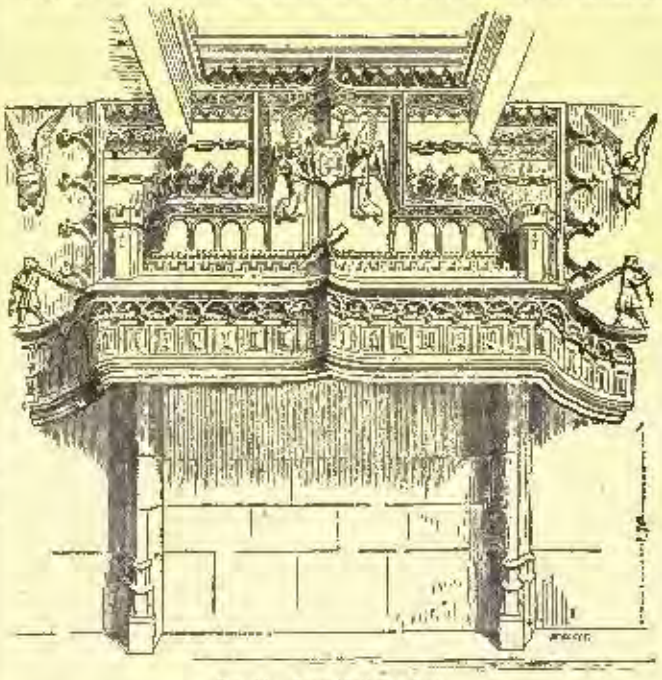


Fig. 22. From Viollet-le-Duc.

tion of the hood, which stands 1 meter and 77 centimeters (about 5 feet 9 inches) above the hearth. Fig. 24 gives a detail of a lower corner of the framework. The hood, being plastered and having therefore the appearance of stonework, seemed to the eye too heavy to be self-sustaining. The artist has therefore taken the pains to carve upon the surface heavy cables, in the hopes of being able

thereby to diminish in a measure this disagreeable effect of weakness.

The second fire-place is more profusely decorated, and chains are added as well as man-power on the right and left, to assist the cable in supporting the heavy hood.

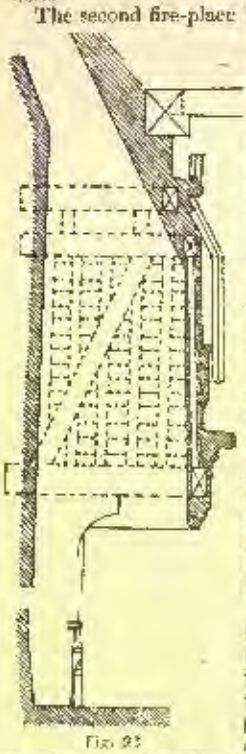


Fig. 23.

Fig. 23 represents one of the richly sculptured fire-places in the Château d'Arnay-le-Duc, of the sixteenth century. It is two and a half meters long by nearly two meters high, and stands in a room four and two tenths meters high.

The fire-places thus far described have not exceeded eight or ten feet in width. When very large halls or saloons in palaces or public buildings were to be heated they sometimes measured thirty or forty feet, and were decorated in a most sumptuous manner. In this case, however, it was necessary to support the mantel by intermediate piers, as shown in Fig. 26. When these piers extended from the front to the back they formed, under a single mantel, separate fire-places, each having a distinct flue of its own, as shown in Figs. 27 and 28, the former being from the Château de Coney, France, and the latter from the Grand Hall of the Palais des Comtes of Poitiers.

The subdivision of the opening and flue into several parts had other objects besides that of properly supporting the mantel. The ties or withes strengthened the walls, and the draught of each was materially improved by having its own small, independent flue. When the fire was first lighted, or when less than the ordinary amount of the heat was required, it was possible to confine the fire to a single section. By this arrangement each part, besides having sufficient draught of itself, served also to heat and improve that of the rest.

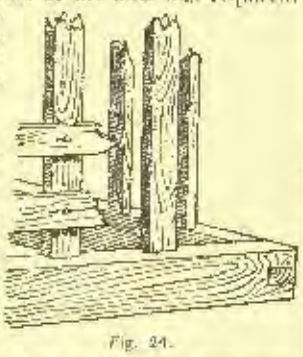


Fig. 24.

The fire-place represented by Fig. 28 was built in the fifteenth century, and occupies one end of the hall in which it stands. "It is," says Viollet-le-Duc, "no less than 10 meters long and 2.80 meters (9 feet) high under the mantel. . . . In the interior of the public buildings as well as in the exterior, the Middle Age understood how to produce imposing effects of architecture, which make the treatment even of our most important modern buildings seem weak and insignificant by comparison.

"When the counts of Poitiers, in their grand robes of state, sat enthroned in this hall, surrounded by their officers; when behind the feudal court blazed the three fires on their three hearths; and when,

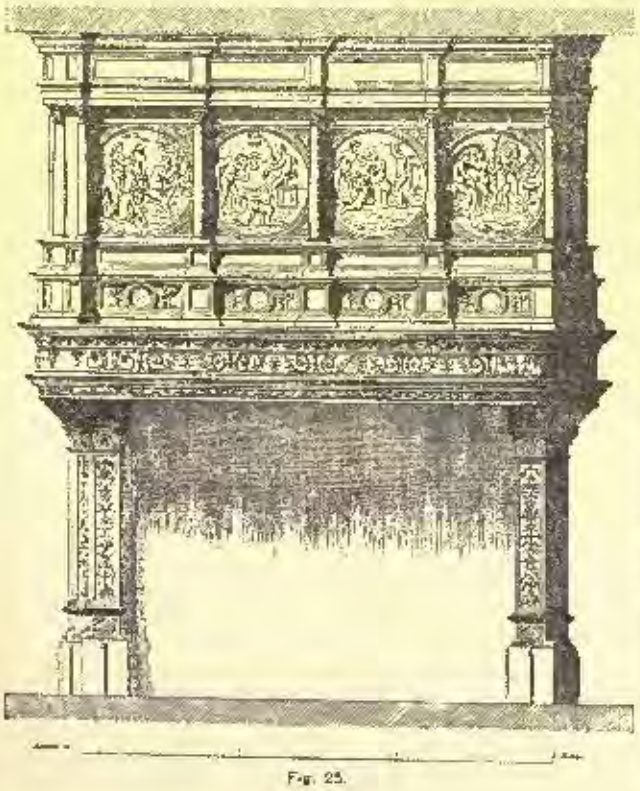


Fig. 25.

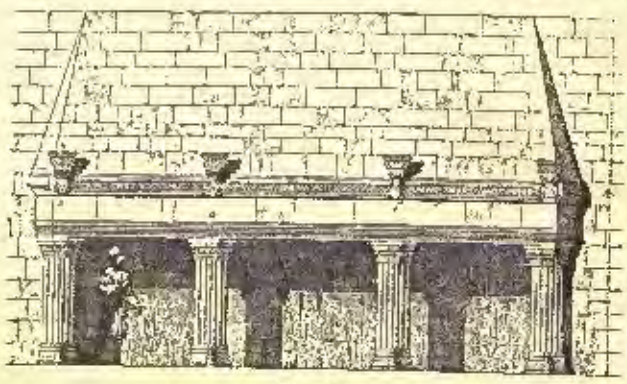


Fig. 26.

to complete the picture, the assistants were seated on benches before the gorgeous windows above the mantel, one can imagine the respect

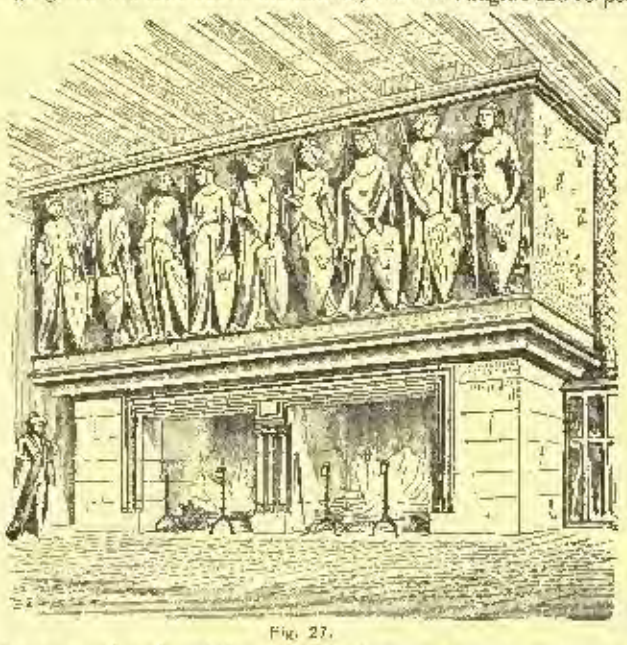


Fig. 27.

that a scene of such nobility and grandeur ought to have inspired in the minds of the vassals assembled around the court of their lord.

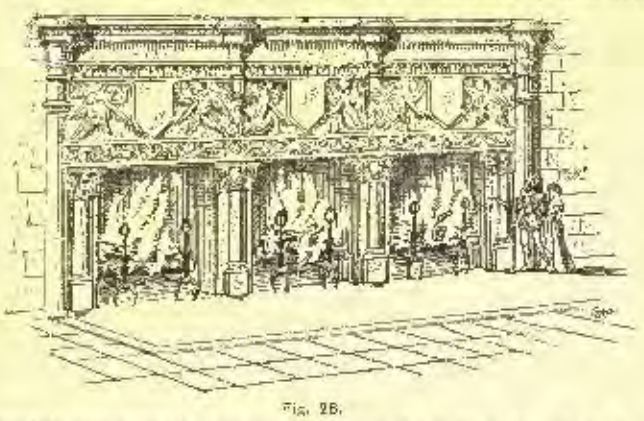
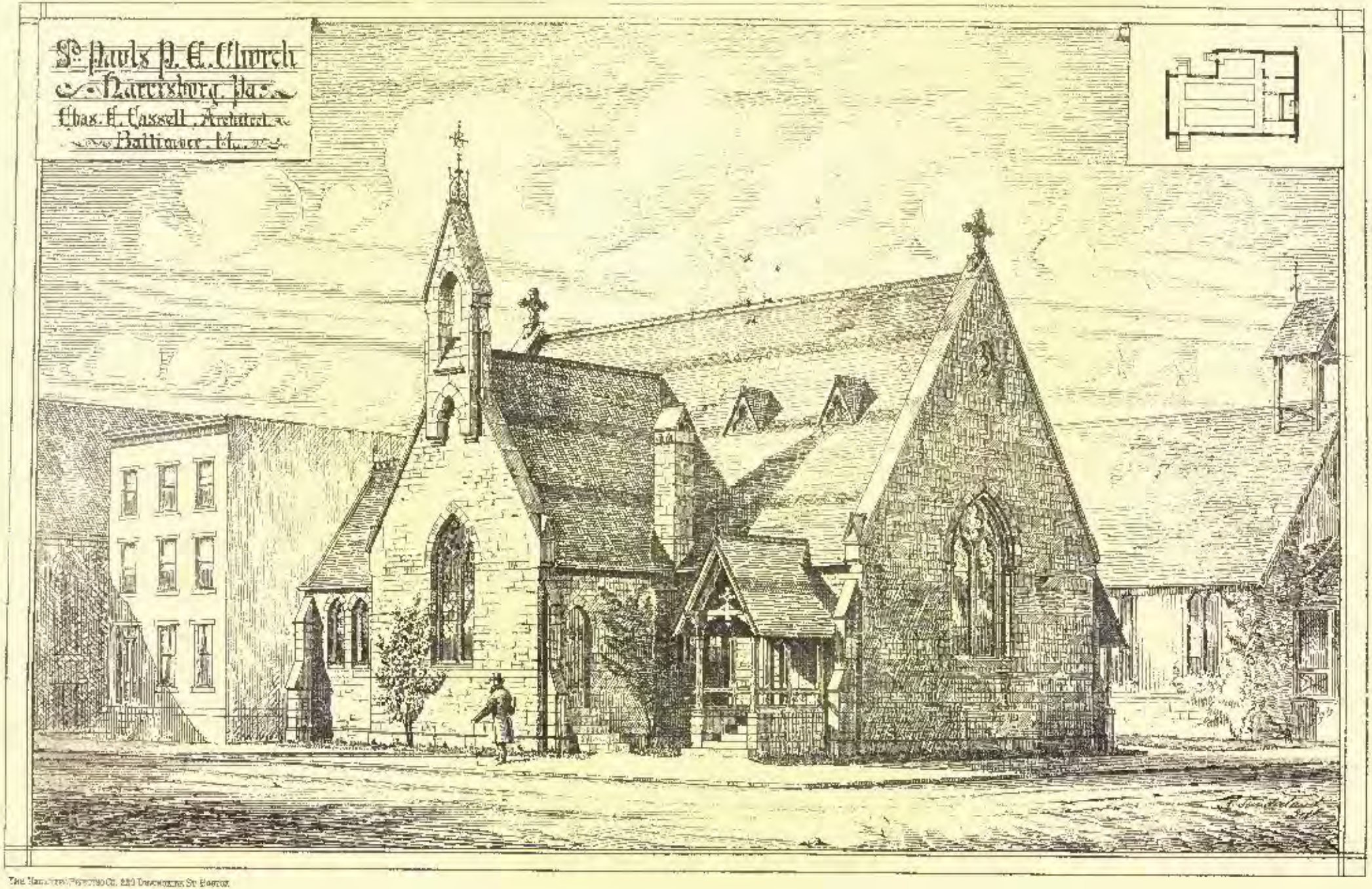


Fig. 28.

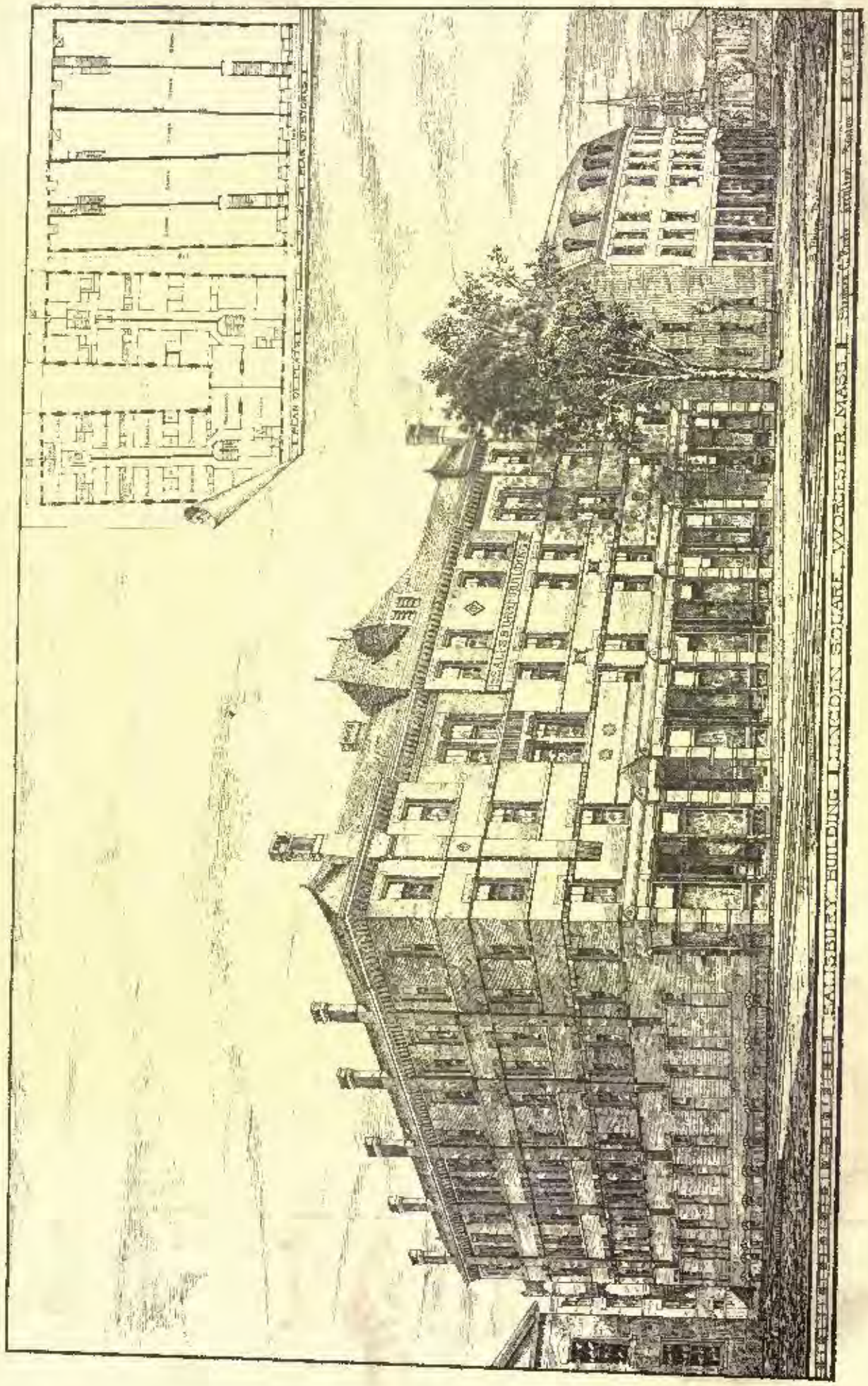
Certainly one should feel himself triply in the right to be able to defend his cause before a tribunal so nobly seated and surrounded."

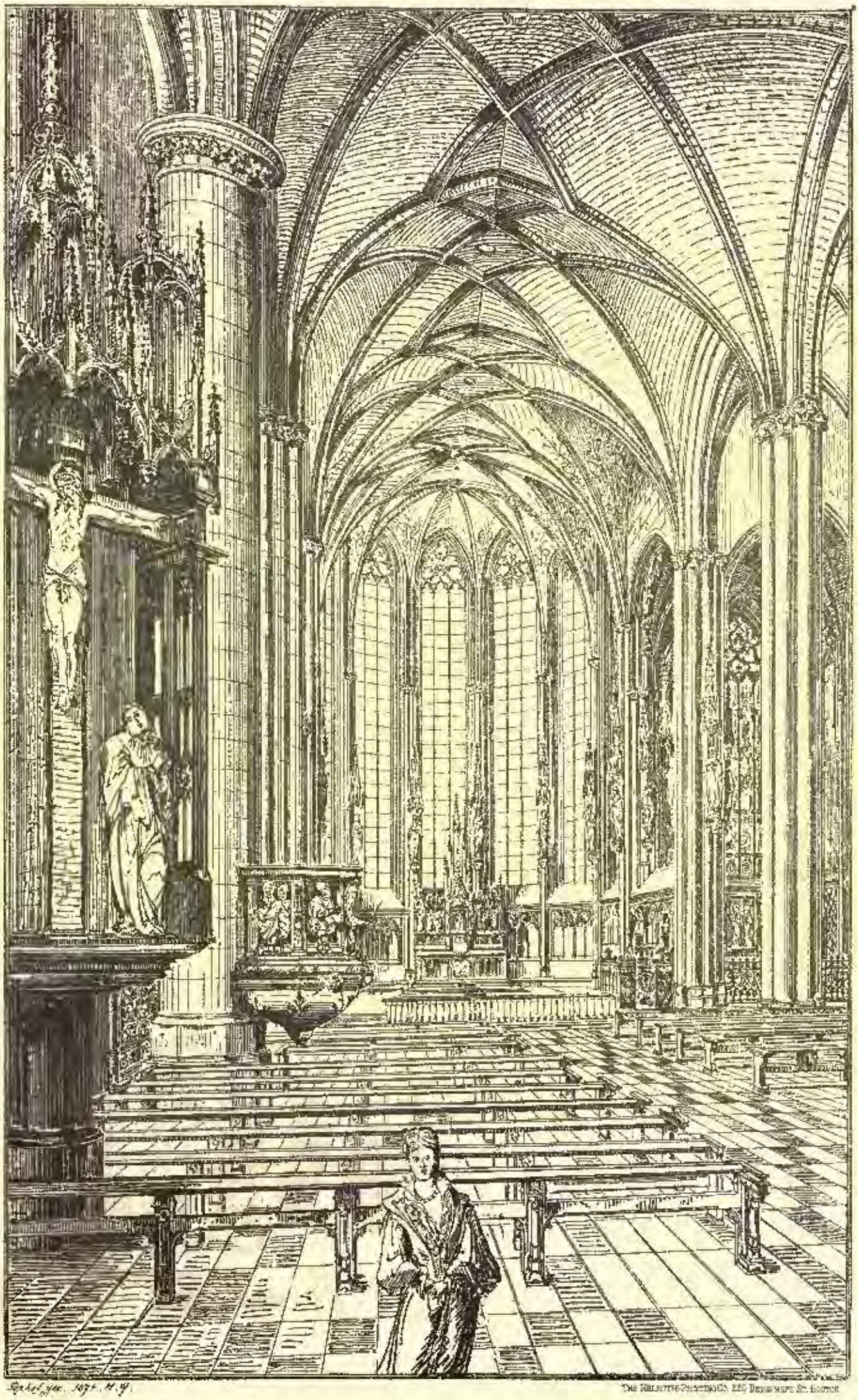
HOUSE DRAINAGE IN PHILADELPHIA.

A typical case of modern house drainage is now being considered by the College of Physicians, — typical in so far as it is believed to represent the rule rather than the exception among a large class of houses of modern construction. In the particular house in question there recently occurred four cases of typhoid fever of the most malignant sort, two of the cases proving fatal. The attending physician, in a communication to the Philadelphia *Inquirer*, says that in a house "with a handsome exterior, and in a fashionable part of the city, his attention was called to the drainage, on account of the odors that prevailed and the sickness that was induced thereby. He made, with an experienced plumber, a careful examination of the drainage. The pipe from the roof in the front part of the house was a corrugated galvanized iron one, and passed



The Matthews Printing Co. 210 Devonshire St. Boston.


SALISBURY BUILDING, LINCOLN SQUARE, WORCESTER, MASS.



INTERIOR OF THE CHURCH OF ST. LAMBERT
MÜNSTER, WESTPHALIA.

House at Winchester, for Mrs. S.L. Norrell
A. VERANDAH F. CLOSET
B. PANTRY G. STAIRCASE
C. KITCHEN H. DINING Rm
D. BACK STAIRS I. HALL
E. CHINA CLT K. PARLOR
PLAN OF FIRST STORY
A. CLOSET G. CLOSET
B. BATH Rm H. LINEN CLT
C. W.C I. NURSERY
D. BED Rm K. DRESS Rm
E. STAIRCASE L. - DITTO -
F. CLOSET M. BED Rm
PLAN OF SECOND STORY
Wheelwright & Haven Architects Boston, Mass.

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to the cellar between the studding and the wall; it opened into an iron one that emptied into the terra-cotta drain, and from that into the sewer without a trap.

"Its joints were so loose that the sewer gas was noticeable at once in the cellar, and the pipe thus absolutely carried the emanations from the sewer directly into the house. The stationary wash-stands in the second and third stories were trapped by *one trap* in the cellar alone. Then, again, the roof-pipe in the back building ran down the outside of the house into the terra-cotta drain, *trapless*, and, as all its joints were loose, sewer gas was carried by every breath of wind into the chambers from the rear."

A strenuous movement is now being made, by influential members of the profession, to secure a proper supervision of house drainage by the public authorities.

This is but one of many indications of the attention now being given to this question by men who five years ago were content to leave it entirely with the plumbers. It is inevitable that their agitation and solicitude must result in a thorough and radical reform of the whole subject. Its importance is unquestionable. It lies at the very foundation of the question of public health, and it is safe to predict that it must soon take its proper position as by far the most important branch of the whole subject of house building.

It is of the greatest consequence to the architectural profession. It was not to be wondered at that architects, following their profession as a business, should have applied themselves chiefly to furnishing their clients with the wares for which a demand existed. It was not to be expected that they, more than any other business men, should interest themselves in matters lying outside of the accustomed line of their trade. Being generally men of artistic training and tendencies, without especial leaning to the dry scientific problems of disease and its causation, it was quite natural that they should pursue their art as artists, and leave to mechanics the prosaic matter of plumbing.

Such a course of action will not much longer be prudent. Attention being generally called to the subject, the house-building public will naturally demand that it receive the best and most thorough consideration at the hands of those who are employed to prescribe details of construction. It has frequently been suggested that sanitary experts be employed, at the expense of the client, to regulate all matters connected with drainage. This seems to us as unreasonable as it would be to require the client to employ an engineer to determine the required strength of material. It is the architect's business to build the house, and he should be qualified to do the whole work from beginning to end, — not only as an artist to determine its appearance, but as an engineer to determine its strength, and as a sanitarian to regulate its drainage, its ventilation, and its temperature.

Indeed, the architect who knows all the details of the structure, from the bottom of the foundation, is ordinarily the only person who is competent to decide precisely what should be done, or, in the case of old buildings, precisely what has been done. The writer was employed to examine a house previous to its occupancy by a tenant. Everything in sight was in satisfactory condition, and the owner gave assurances that he had himself had every part of the work outside the walls thoroughly renewed. The mason who did this work was confident that it was perfectly sound. Later, indications of diphtheria appearing, this same mason made a second examination, occupying the whole of two days, without finding anything wrong. Pursuing his investigations still further, he found an unsuspected old drain connected with the interior drainage by a concealed pipe, which was clearly the cause of the mischief. The most competent expert cannot always discover, without a destructive amount of overhauling, what the architect should know as a matter of course, — what he should know, but by no means always does know, for we have in mind a case of an architect of much eminence whom we found entirely ignorant as to the direction and use of the waste-pipes in his own house.

THE ILLUSTRATIONS.

THE "SALISBURY BUILDING," FOR STEPHEN SALISBURY, JR., WORCESTER, MASS. STEPHEN C. EARLE, ARCHITECT, BOSTON.

THIS building was finished in the early part of the season. The walls are of face-brick and Longmeadow brown stone, and the inside is finished throughout with hard woods. There are five stores in the first story and twelve dwellings in the three flats above. The cost was about $70,000.

HOUSE AT WINCHESTER, MASS. MESSRS. J. F. OSER AND G. D. RAND, ARCHITECTS, BOSTON.

ST. PAUL'S CHURCH, HARRISBURG, PA. MR. CHARLES E. CASSELL, ARCHITECT, BALTIMORE, MD.

CHURCH OF ST. LAMBERT, AT MÜNSTER, WESTPHALIA.

This interior view, like the exterior which we gave in our number of December 14, is copied from the *Allgemeine Bauzeitung*.

WORKMEN'S SHARE IN PROFITS. — Recent calculations represent that the Italian workman receives 17 to 20 per cent of the profit on his work; the Frenchman, 47 per cent; the Englishman, 56 per cent; and the American, 72 per cent.

VOSE'S GEOMETRICAL DRAWING.[1]

THIS is a well-ordered manual, intended to acquaint beginners with the methods of graphical construction. It consists of a series of problems arranged in seven parts or chapters, beginning with the ordinary graphical problems of the construction and division of lines, angles, and arcs, the construction of polygons, circles, and tangents, continued with conic sections and cycloids, the orthographic projections and penetrations of various solids, development of surfaces, and, finally, isometric projections. The problems are, for the most part, such as are of common occurrence and use in graphical work, some rather unusual and ingenious ones being added, which will be of value as exercises. The matter is well selected and well distributed, with an occasional lapse of symmetry or proportion, which is more a literary blemish than a practical one. Thus, in the problems on conic sections, no description of the ellipse is given, nor any means of determining the foci, or account of their properties; nor is the ordinary means of describing the ellipse from its foci alluded to. On the other hand, the characteristic focal property of the parabola is given; but the distinction, very important to a clear graphical idea of the curves, that whereas ellipses and hyperbolas vary infinitely all, parabolas are alike except in size, is not noticed. The chapters on projection and penetrations are remarkably well developed, the method of revolutions used in Descriptive Geometry being systematically applied throughout, in such a way as ought to lead a learner by easy progression to a very clear and serviceable knowledge of the projections, sections, and intersections of the various solids that are discussed, chiefly prisms, pyramids, and solids of revolution. A knowledge of geometry is presupposed or ignored; no definitions are supplied, and the solutions are given without demonstrations. The explanations are terse and usually clear, with now and then something that looks like an oversight, as when, in problem 3 of Plate VII. in the ellipse, the student is told to bisect any two parallel lines, meaning chords, the distinction being by no means inessential. The learner is recommended in the preface to begin the book with a master. A student with a fair knowledge of geometry ought to find no difficulty in using it alone, although he would perhaps here and there meet with a construction of which he would find it hard to see the reason; and, a student who did not know geometry might, with a good teacher's help, get from it a good working knowledge of most of its substance, but alone he would probably find it rather discouraging, as all such study is apt to be. It is a book which should be very useful in the instruction of mechanical or architectural draughtsmen, and due study of it would relieve a good deal of helplessness that now exists.

THE OLD HOUSE ALTERED.[2]

EVERY new venture into the field of general literature by an architect, having in mind the inculcation of sound principles of building, the creation of a popular sympathy for his processes, and the formation of an intelligent appreciation of the results of his work, should be received by the profession in no hypercritical spirit, if the effort is honest and the workmanship, with pen and pencil, respectable. It would seem that the development of a design in the mind of an architect, as, in its successive stages, it is set down upon paper, until a result is finally reached meeting the conditions of the problem in a manner to satisfy all the conditions of design, both practical and æsthetical, might readily be made interesting and profitable reading to the layman. But however familiar the operation of this mental machinery may be to the professional man, it has rarely or never been so graphically set forth as to do justice to the subject. Up to this time Viollet-le-Duc appears to have been the only architectural litterateur who has in any degree succeeded in interesting the public in such work, though he has been by no means either the first or the last to attempt it.

The latest effort which we have to record is that of Mr. George C. Mason, an architect whose work in Newport is favorably known. This effort takes the form of a series of letters between Fred, the architect, and Mary, his sister, touching the alteration of an old familiar homestead for her use, so as to suit the requirements of a more civilized and luxurious method of living. There are twenty-nine of these letters, on the one hand giving professional advice upon practice and theory, and on the other setting forth the questions, the trials, the wants, of the amiable client, who, in her relations with the adviser, exhibits a subordination, an intelligence, an appreciation, which we fear is rare in the experience of the profession. We beg to pay our respectful homage to this excellent lady as an ideal employer of professional talent. Were all our clients like her, domestic architecture would indeed be what to the outsider it seems, "the prettiest occupation in the world." Design developed in such a blissful atmosphere of mutual accommodation, with no difficult whims or caprices to reconcile with art, no compromises to make between convenience and beauty, should be Arcadian in its results. The temple in Paradise Lost, which

> "Rose like an exhalation to the sound
> Of dulcet symphonies and voices sweet,"

[1] *An Elementary Course of Constructive Drawing*; containing Problems on the Right Line and Circle, Conic Sections, and other Curves; the Projection, Section, and Intersection of Solids; the Development of Surfaces; and Isometric Perspective. By George L. Vose, A. M., Professor of Civil Engineering in Bowdoin College, author of Manual for Railroad Engineers. Illustrated by Thirty-Eight Plates. Boston: Lee & Shepard, Publishers; New York: Charles T. Dillingham.

[2] *The Old House Altered*. By George C. Mason. Illustrated. New York: G. P. Putnam's Sons. 1878.

is the only other example we can recall of architecture so harmoniously created, unless indeed we may refer to the older fable of Amphion. The weary practitioner turns to the new dulcet symphonies and voices sweet in these mellifluous letters with a certain feeling of gratitude, recognizing in them an echo of his earliest ideals of practice, now long since forgotten in the midst of the jarring and discord of actual experience.

Thus the architectural achievement in this book is unusual rather in its method than in its result. Old things are made new in the customary fashion, and in a manner which hardly challenges professional criticism. It may be observed, however, that the plan and perspective view of the original house do not comport one with the other, in an essential point; that the old honest square hipped-roof house becomes a sophisticated Swiss cottage, with balconies, bay-windows, verandas, and decorated gables, and, withal, with a certain display of blank windows, which assuredly is not according to sound principles of design; that the elevations are confused with a curious tangle of cross-hatching, suggesting shadows and shades which could hardly exist; but that the plans are intelligent and well put together, and that the practical advice for the most part is good. There are various sketches of furniture and chimney-pieces in the style of the period.

The digressions relating to theory, those, for instance, entering upon the large questions of honesty in design, color, furniture, and other matters of decoration, contain nothing that we are not used to hearing. The theories of interior decoration, in especial, are open to the objection, so common in most books of this class, of substituting absolute assertions for principles logically deduced and rationally developed, — principles which in their nature shrink from dogmatic statement. The advice upon these points is very elementary, and the good lady, in following it, can hardly have passed beyond the limits of the conventional "good taste" into the region of free and intelligent artistic expression. The scheme of the book is well devised to show how certain fundamental principles of design may be applied to common things, such as the treatment of walls, floors, and ceilings, and the selecting of furniture; but the opportunity is not used with that mastery of the subject which the architect should display in order to justify his authority. The points which he makes are in the nature of hints of practice; they scarcely open any new vistas of thought. The book therefore seems, from an architect's point of view, to have no distinct *raison d'être*. It was, however, undoubtedly written for the non-professional public.

REPORT OF THE COMMITTEE ON NATIONAL SURVEYS.

[The Committee of the National Academy of Sciences, appointed under Act of Congress to consider and report upon the system of public surveys, has made its report, of which we give the essential parts.]

The works which seem to fall especially within the limits of the meaning of the law are the geographical surveys west of the one hundredth meridian under the War Department, the United States geographical and geological surveys of the Territories and of the Rocky Mountain region under the Interior Department, and the system of land surveys under the supervision of the Land Office. Besides these, although not enumerated in the law, one of the most important works now in progress in the Interior, under Act of Congress, is the geodetic work of the Coast and Geodetic Survey. Parties of this organization are now conducting a systematic triangulation at several points in the interior, and any general system, such as is contemplated in the above law, cannot be wisely devised without taking into account the object and organization of this survey. The objects of these various surveys are: 1. An accurate geodetic survey. 2. A general geographical and topographical reconnoissance. 3. Land-parcelling surveys, on which the Government can part title to portions of the public domain. 4. The economic classification and valuation of the public domain. To these should be added the gradual completion of a general accurate topographical map of the whole territory of the United States, which shall serve as a basis for all the scientific and practical needs of the Government and people. All this work may be included under two distinct and separate heads: 1. Surveys of mensuration. 2. Surveys of geology and economic resources of the soil.

We will first consider the present operations of the surveys of mensuration. Such surveys are now in progress under five different independent organizations: that of the Coast and Geodetic Survey; of the geographical surveys west of the one hundredth meridian, under the War Department; of the topographical work of the two surveys under the Interior Department; and of the land survey under the Land Office. The final object of all these works of mensuration is the accurate determination of position and the laying down of lines and points by measurement. There is at present no coördination between these five surveys; their original determinations of position are independent; their systems of survey discordant; their results show many contradictions, and involve unnecessary expenditure. The geographical reconnoissances carried on under the War and Interior Departments are of little value for the parcelling of land, while the land surveys are of correspondingly slight topographical and geographical value. The operations of the Coast and Geodetic Survey in the interior do not at present include topography and land parcelling. To attain the desirable accuracy and economy it is absolutely essential that there should be only one geodetic system, one topographical system, and one land-parcelling system, all conducted under the same head. It is evident that both topographical and land-parcelling surveys, to be properly coördinated and sufficiently exact, must be based upon a single rigid geodetic foundation. All these three divisions are departments of measuring, all are based upon accurate determinations of position, and, to be effectively and economically carried out, should be united into one comprehensive system. After a careful consideration of the facilities at the disposal of the several existing organizations engaged in this work, the committee believes that the Coast and Geodetic Survey is practically best prepared to execute the entire mensuration system required for the survey of the public domain. Within this domain the dominant interest of the United States is centered in the public lands which remain to be surveyed and sold. The administration of this domain, consisting of 1,101,107,183 acres, is necessarily within the Department of the Interior, while the Coast and Geodetic Survey, having been originally inaugurated to meet the wants of commerce, has been hitherto under the Treasury Department. In view of the paramount importance of the public lands, the committee recommends that the Coast and Geodetic Survey should be transferred from the Treasury Department to the Department of the Interior, retaining its original field of operations, and assuming also the entire mensuration of the public domain; and that, so modified and extended, it should hereafter be known as the United States Coast and Interior Survey. This organization would then embrace, in addition to its former work, a geodetic survey of the whole public domain; a topographical survey comprising detailed topographical work and rapid reconnoissance and land-parcelling surveys. The Superintendent of the Coast and Interior Survey should be appointed by the President, and should report directly to the Secretary of the Interior.

The best interests of the public domain require, for the purposes of intelligent administration, a thorough knowledge of its geological structure, natural resources, and products. The domain embraces a vast mineral wealth in its soils — metals, salines, stones, clays, etc. To meet the requirements of existing laws in the disposition of the agricultural, mineral, pastoral, timber, desert, and swamp lands a thorough investigation and classification of the acreage of the public domain is imperatively demanded. The committee therefore recommends that Congress should establish, under the Department of the Interior, an independent organization to be known as the United States Geological Survey, to be charged with the study of the geological structure and economical resources of the public domain; such survey to be placed under a director who shall be appointed by the President, and who shall report directly to the Secretary of the Interior. It should be specially provided that the director and members of the Geological Survey, charged as they are with the investigation of the natural resources of the public domain, should have no personal or private interests in the lands or mineral wealth of the region under survey, and should execute no surveys or examinations for private parties or corporations. Officers of the army and navy, when not otherwise employed, may be detailed by the Secretaries of War or of the Navy to take part in the operations of the general survey.

With the inauguration of the two surveys above defined, the committee recommends a discontinuance, first, of the present geographical and geological surveys west of the one hundredth meridian under the War Department, except surveys necessary for military purposes and local internal improvements; second, the geographical and geological surveys now in progress under the Department of the Interior; and, third, the present land surveys under the Land Office. The effect of the above changes will be to maintain within the Interior Department three distinct organizations, — first, the Coast and Interior Survey, whose function shall embrace all questions of position and mensuration; second, the United States Geological Survey, whose function shall be the determination of all questions relating to the geological structure and natural resources of the public domain; third, the Land Office, controlling the disposition and sale of the public lands, including all questions of title and record. With this division should be secured a perfect coördination and cooperation between the three branches. The Land Office should call upon the Coast and Interior Survey for all surveys and measurements required for the sale and disposition of lands. The Land Office should also call upon the United States Geological Survey for all information as to the value and classification of lands. The results of all the mensuration surveys, as soon as completed, should be immediately available for the Land Office, and for the Geological Survey, and for other branches of the Government as required. The Geological Survey should be authorized to execute local topographical surveys for special purposes, — such, for instance, as the subterraneous surveys of mining districts and metallic deposits, etc.

Each of the three organizations thus defined should make an annual report of its operations to the Secretary of the Interior. The publications of the Land Office should embrace reports of its business operations relating to the disposition and sale of land, together with the necessary maps. The publications of the Coast and Interior Survey, besides the annual report of operations, should consist of its geodetic results, geographical, topographical, and cadastral maps, coast charts, and such discussions and treatises connected therewith as the superintendent shall deem of value. The publications of the Geological Survey should consist of an annual report of

operations, geological and economic maps, illustrating the resources and classification of the land, reports upon general and economical geology in all its branches, with the necessarily connected paleontology.

All collections made by the Coast and Interior and the Geological Surveys, when no longer needed for the investigations in progress, should be transferred to the National Museum.

The committee recommends that, upon the organization of the United States Coast and Interior Survey, and the United States Geological Survey, a commission should be formed, to consist of the Commissioner of the Land Office, Superintendent of the Coast and Interior Survey, Director of the United States Geological Survey, the chief engineer of the army, and three other persons to be appointed by the President, who shall take into consideration the codification of the present laws relating to the survey and disposition of the public domain, and who shall report to Congress within one year a standard of classification and valuation of the public land, together with a system of land-parcelling survey. The necessity of this commission is evident from the fact that by far the larger part of the public domain lies in the region where, from geological and climatic causes, the lands are, for the most part, not valuable for field culture, and where the system of homestead, preemption, and sale in accordance with existing laws is both impracticable and undesirable.

In regard to publications of the two surveys above defined, the committee recommends that, besides the number of copies of each report which Congress may order for its own distribution, 3000 copies be published for scientific exchanges by the heads of surveys, and for sale at the price of publication; that all literary and chartographical material received by the heads of these surveys, in exchange, be the property of the United States, and form a part of the libraries of the two organizations; that the money resulting from the sale of these publications be covered into the Treasury. The committee recommends that the annual reports of operations of the two surveys accompany the report of the Secretary of the Interior; that the special memoirs and reports of both surveys be issued in uniform quarto series; that the style and scale of the chartographic publications be determined by the heads of each organization, so as to express the scientific results in the most effective and economical manner. B.

THE ASSYRIAN GATES.

THE new session of the Society of Biblical Archæology was opened lately, the president, Dr. Samuel Birch, in the chair. Mr. Theophilus G. Pinches read a paper on "The Bronze Gates of Shalmaneser III., lately discovered by Mr. Rassam at Balawat." Mr. Pinches confined himself in his paper to the two pairs of bronze gates of Shalmaneser III., a larger and a smaller, as he will also in at least one more paper which is to follow. The mound of Balawat is nine miles northeast of Mosul, or say the Nineveh site, and represents an ancient Assyrian fortress, which before the reign of Assurnazirpal, father of Shalmaneser III., whose reception of tribute from Jehu, king of Israel, is recorded on the famous black obelisk, was known as Kharrân. Though so close to Nineveh, it had been taken and held by the Babylonians during a period of Assyria's political decline, perhaps coincident with the epoch of Hebrew ascendancy. But when Assurnazirpal, a great warrior, came to the throne, he recovered the city, and renamed it Imgur-Beli, and built there a temple to the god Makhir, near the city's northeastern wall. These facts are recorded on alabaster tablets found by Mr. Rassam in a coffer of the same material near the entrance of the temple itself. As Mr. Pinches remarked, they shed a fresh ray of light on one of the darkest periods of Assyrian history. The mound is nearly rectangular, and its corners are turned pretty accurately towards the four cardinal points of the compass. The temple ruins lie near the northeastern edge, where ran the city wall. In the western half of the mound four stone platforms were found, marking the sides of an irregular square. While digging round these platforms Mr. Rassam unearthed some pieces of bronze, chased, and at length two huge bronze monuments slowly came to view. They were of the strangest shape. Each seemed formed of a centre piece with seven long arms on either hand, like colossal hat-racks, with which the first published accounts compared them. Even after laying them bare, the energetic excavator had great difficulty in disinterring them, and was mortified at having the precious bronzes split and cracked as the sun dried up the earth in which they had lain buried during so many centuries. According to the explorer's ground-plan the platforms mark the entrances to the court-yard of a noble palace, having two entrances on the northeast and two others on the northwest. The bronzes arrived at the British Museum at the beginning of August last. There they met with an enthusiastic welcome, and no less naturally called forth much speculation as to their nature and use. To Mr. Ready, the ingenious artificer of the department at the British Museum, whose task it was to see to the cleansing of the fragments, piecing them together, and nailing them with the original bronze nails on wood of the same thickness as that which underlay the plates thus fastened, belongs the merit of solving the riddle. He was the first to see that the bronze plates of the larger of the two monuments had formed the coverings of an enormous pair of rectangular folding-doors, each about twenty-two feet in height and six feet broad, which had evidently turned on pivots, and were held up at the top by strong rings fixed in the masonry. The body of the doors was of wood, three inches thick, as measured by the nails, which are found to be clinched a little more than that distance from the heads, the overplus being just the thickness of the bronze plates themselves, which is about one sixteenth of an inch. Each door revolved on a circular post, about a foot in diameter. Each post had a pivot at the bottom. The pivots are at the Museum, but the sockets in which they turned were unfortunately left behind. The bronze plates are about eight feet long. They were nailed horizontally across each door, but allowing for their extension round the post, the total length across each leaf was but six feet. The style of each leaf was also overlaid with a bronze edging, which overlapped the door by about a couple of inches. On the right it is cut plain, but is indented on the side overlapping the back of the doors. The smaller pair of gates is much more decayed than the other. Its designs represent hunting scenes, and it belongs to the same reign as the larger, whose inscriptions are those of Shalmaneser III. The representations on the plates of both pairs are in the *repoussé* style. Those on the plates of the great gates depict Shalmaneser's battles, sieges, triumphal processions, the tortures inflicted on his prisoners, and his worship of the gods. The bronze plates covering the styles of the doors are also engraved with historical inscriptions, of which, reserving for another time his account of the extremely numerous and interesting designs chased on the doors themselves, Mr. Pinches gave an outline. The record on the styles, he observed, though somewhat fuller than that on the black obelisk, and than the Kurkh and Bull inscriptions, is very carelessly executed, even the chronological order of events having been to some extent inverted. The new document begins with Shalmaneser's Babylonian campaign, when he went to help King Marduka Suma-libbi against that Babylonian monarch's revolting brother. Next, it places his war in the region of Mount Ararat, followed by that against Gozan, and his triumph over Akhuni, king of Borsippa, which paved the way for his conquest of Syria and Palestine. A critical comparison of all the sources proves, however, that the Ararat campaign came first, and then his expeditions against Akhuni and the Babylonian war. In concluding, Mr. Pinches held out the hope of identifying, in his future paper on the bas-reliefs (which greatly exceed in number those in the Nimrood Gallery of the British Museum), some Jewish faces of the ninth century B. C. It is certain that, as he remarked, this wonderful monument cannot fail to be of great use to the ethnologist, as well as to the philologist and the antiquarian. — *The Architect.*

THE LATE COMPETITIONS IN INTERIOR DECORATION.

BEFORE we enter upon a new series of competitions, as we shall do early in the following year, we must, in accordance with our promise, give some account of the competitions which have taken place during the present year.

Of these competitions there have been five, the subjects of which have been (1) a staircase; (2) the interior of a bay window in a drawing-room; (3) the decoration of a dining-room wall; (4) a stone fire-place in a dining-room; and (5) the interior of a vestibule.

Fifty-three competitors have taken part in these trials of skill, and have contributed their drawings, ninety-one in all, from many distant cities, as we have received drawings from Boston, Cambridgeport, and Roxbury, Mass.; Providence, R. I.; Hartford and Fair Haven, Conn.; New York, Troy, Rochester, and Mamaroneck, N. Y.; Camden, N. J.; Philadelphia and Lancaster, Penn.; Baltimore, Md.; Chicago, Ill.; Cleveland, O.; St. Louis, Mo.; St. Paul, Minn.; Oakland, Cal.; Toronto and Ottawa, Can.

We trust that this exhibit will urge our old competitors to renew their contributions, and will encourage others to disregard the fact that they and our office are separated widely.

The honors have been awarded as follows, the committee of award being composed of different architects for each competition, to whom the authors of the respective designs were wholly unknown.

First Prizes. Competition I., J. T. Kelley, Boston, "*A. B. C.*" Competition II., P. P. Furber and R. D. Andrews, both of Boston, "*Midnight Oil.*" Competition III., J. T. Kelley, Boston, "*X. Y. Z.*" Competition IV., J. W. H. Watts, Ottawa, Can., "*Hope.*" Competition V. (no prize was given).

Second Prizes. Competition I., H. M. Stephenson, Boston, "*1878 over a shield.*" Competition II., J. W. H. Watts, Ottawa, Can., "*A Rough Sketch.*" Competition III., D. W. Willard, New York, "*Bay State.*" Competition IV., A. Trescott, Camden, N. J., "*Hope with an Anchor.*" Competition V. (no prize was given).

Mentions. Competition I., A. Trescott, Camden, N. J., "*St. Ansell.*" W. A. Bates, New York, "*Essayons.*" W. E. Chamberlin, Cambridgeport, "*T-Square Pasha.*" P. Phipps, Boston, "*With Hope.*" J. H. Clough, Boston, "*Japanese Fan.*" Competition II., D. W. Willard, New York, "*Ars longa vita brevis est,*" and the author of the design "*H in a circle,*" whom we cannot identify. Competition III., C. H. Walker, Boston, "*Incanus.*" A. Trescott, Camden, N. J., "*A palm branch crossed by an arrow.*" Competition IV., C. H. Walker, Boston, "*Acanthus.*" Competition V., A. Matthews, Oakland, Cal., "*Hero.*" J. W. H. Watts, Ottawa, Can., "*Stat nomen in umbra.*" R. C. Kennedy, Philadelphia, "*Nemo.*" J. J. Dull, Philadelphia, "*Ichinus.*"

BOOKS RECEIVED.

Art in the Home. Historical, Critical, and Æsthetical Studies on the Decoration and Furnishing of the Dwelling. By Jacob von Falke, Vice Director of the Austrian Museum of Art and Industry at Vienna. Authorized American edition, translated from the third German edition. Edited, with notes, by Charles C. Perkins, A. M., author of "Tuscan and Italian Sculptors," etc.; corresponding member of the French Institute. Illustrated by chromo-lithographs, albertotypes, and typographic etchings. Boston: L. Prang and Company.

Plans of Twenty-Seven Doric Temples. Taken from the best authorities and drawn on a uniform scale. By Charles H. Burr, student in the Lawrence Scientific School, Harvard University, Cambridge, 1878.

NOTES AND CLIPPINGS.

Fairmount Park. — At the seventh annual meeting of the Fairmount Park Art Association the report of the Secretary stated that "since the last annual meeting the Tam O'Shanter group, consisting of four life-size figures in red stone, executed by Thom, has been placed on the river drive opposite the boat-houses, in the old park, under a handsome rustic shelter, which was built from a design made expressly for this purpose by Chas. M. Burns, Jr., architect." A drinking fountain, the gift of Mrs. R. D. Wood, has been erected on the Wissahickon Drive near the site of the Old Log Cabin. Also near the same site an Italian white marble horse trough, the gift of Mr. Charles S. Knies. A Trophy in buff terra cotta and faïence was presented by Messrs. H. Doulton & Co., of Lambeth, London, England, to the Association at the close of the Centennial Exhibition, but it has been discovered that it is so defective that it cannot be placed in position; no less than 127 pieces of its several hundred parts having been lost or hopelessly broken. An effort has been made to get their duplicates in England, but without success. It has been determined, however, to procure in this city eight pieces of the work necessary to complete the six columns which were designed to support the dome of the Trophy, and then place them in Horticultural Hall, if the Commissioners of Fairmount Park approve of such disposition of them.

Washington Sewerage. — The urgent necessity of taking some effective measures to complete the sewerage of Washington, so as to make it effective in carrying off and ridding the city of the noisome filth, decaying matter, and poisonous gases which now infest the atmosphere, becomes every day more apparent. The Senate committee on the District appears to have taken the matter into earnest and energetic consideration, and in order to avail itself of the widest and best possible information on the subject, some six or eight months ago requested Col. Gustavus A. Karweise, who was then departing for Europe as commissioner for Missouri to the Paris Exposition, to examine the sewerage systems of European cities similarly situated to our own, and draw up and report an effective plan for perfecting ours. The colonel has accordingly made an extended survey of the subject in Europe, and has recently returned and submitted a most elaborate report, with explanatory maps and drawings, which are now being printed. Colonel Karweise was once consulting engineer to the Khedive of Egypt, has been engaged in engineering enterprises at and about St. Louis, and throughout the West.

The Illinois Capitol. — A committee, consisting of five architects in Illinois, will make an examination of the new Capitol building of that State, to ascertain whether reports of its unsafe condition are well founded.

Wind Pressure and the Obelisk. — Mr. John Dixon, in reference to a correspondence as to the capability of "Cleopatra's Needle" to weather the severest gales in its present position, writes: "As to its stability there need be no fear, — one hundred and fifty pounds of wind pressure will not upset it. Eighty pounds of wind-pressure? What does it mean? The structure supporting any instrument that fairly registered such must have been strong enough to withstand itself such a strain; and as a practical engineer I unhesitatingly say no modern building exists in England that will bear anything like it, — certainly not the Ridston Observatory. Twenty-eight pounds pressure per square foot of surface would send a man flying through the air; it would sweep from the rails any passenger train. Seventeen pounds pressure would level the Charing-Cross Station. What fraction of this would obliterate the Crystal Palace, a Lancashire cotton-mill, the Houses of Parliament, the dome of St. Paul's, or an ordinary house, I have not taken the trouble to inquire; but it would be a figure to alarm the theorists of such high pressures as have been mentioned. The windows of a building certainly have to bear an equal stress with the walls, and I suppose it would be immaterial to the glass whether it were placed vertically or horizontally. No obelisk has ever been overturned by the wind, — ours never will be. Revolution, communism, or natural convulsion can alone upset it."

Draining the Roman Colosseum. — The big drain from the Arch of Constantine toward the Church S. Gregorio, which is to carry off the water in the Colosseum, is nearly finished, and already the green and poisonous water seems lower. But the heavy rains have interfered with the work so that is is not likely that the ruin will be drained dry before another season.

Steel in Ships. — A speaker at the British Iron and Steel Institute said: Should it ultimately be proved that sea-water would destroy steel quicker than wrought iron, the use of wrought iron for the skins of ships might be continued; but, with present knowledge, nothing, in his opinion, existed to prevent the whole framework of every steamer and sailing vessel being constructed of Bessemer or Martin-Siemens steel, as at least one third the weight might be saved at the same time that greater security was insured. In the diluted sulphuric-acid bath the evidences were quite clear in favor of mild steel and the purest iron to resist corrosion, but before as much could be said as to the influence of sea or salt water a more extended and careful series of experiments would be required.

Tower at Paris. — The discovery has just been made in Paris of an old tower dating from the time of Philippe-Auguste. It is situated between the Rues Francs-Bourgeois and Blancs-Manteaux. It was completely concealed by a mass of houses built up against it, which have now been pulled down. It is perfectly recognizable both by its cylindrical form and by the nature of its masonry, and was the tenth, starting from the Tower or "Barbel-sur-l'Yonne," the traces of which were found some months ago in digging the foundations for the new market of Ave Maria. The towers and their connecting walls were, in their time, a great work, which excited the admiration of their contemporaries.

Flooding the Sahara. — It is probable that the question whether or not the Desert of Sahara, or, to speak more strictly, that portion of it lying in Algeria, can be converted into an inland sea will be definitely settled by the expedition which has been sent out by the French Minister of Education under the charge of Captain Roudaire. He is to make a thorough examination of the Shot-el-Jerid, and will be assisted by two civil engineers.

The Lighthouse Service. — The following extracts are from the annual report of the Lighthouse Board: —

"The lighthouse establishment now maintains, for the protection of life and the safety of commerce, 1,336 lights (including 638 on the Western rivers), 471 day beacons, 55 fog-signals, operated by steam or hot-air engines, and 3,032 buoys."

"An important work recently undertaken, and for which a large sum is required, is the structure now in course of erection on Stannard's Rock, Lake Superior. The board has, by a modification of the original plans, reduced the estimated cost about $100,000."

"A slight increase in the estimate for repairs and incidental expenses is rendered necessary by the fact that the greater part of the expenses attending a change in the form of lamps, to adapt them to the use of mineral oil instead of lard oil, must be paid out of this year's appropriations. The change is only made in lamps of the fourth, fifth, and sixth classes, lard oil being found to give better results in the larger lamps."

Dust on the Atlantic. — About the latitude of the Cape Verde Islands on the Atlantic it is a frequent experience of voyagers to observe falls of red dust and a dry kind of mist. The material of the dust-mass was examined microscopically many years ago by Ehrenberg, and his opinion was that small particles carried aloft from all countries here formed a transparent dust zone, from which they sometimes sank down, and in whirling movement came to the earth's surface. The material of observation open to Ehrenberg was somewhat scanty. The phenomenon has therefore been lately studied anew, and in a more thorough way, by Herr Hellmann, who examined the log-books of 1,196 ships that had passed through the region in question during the years 1854 to 1871. He deals with the case chiefly from a meteorological point of view, and the following are some of the facts elicited: Most of the dust-falls occur in the zone of the Atlantic between 9 deg. and 16 deg. north. South of 8 deg. north they are extremely rare, and the farthest south hitherto was in 2 deg. 56 min. north, 26 deg. west. The two farthest west were both in 25 deg. 5 min. west, both about 300 miles from Cape Verde. Dust-falls often occur simultaneously at very different points of the "Dunkel Meer," or Dark Sea (as Ehrenberg called it); in one case they were 150 miles apart. They also often last for several days, e. g., ten (April, 1859). Surfaces of very different size, up to 100,000 square miles, may receive dust-falls. There is a yearly period in the frequency of the falls. It seems thus near the African coast most occur in winter; farther west, in the early spring. The direction of the wind during dust-falls was from the east quadrant, and most frequently north-northeast to northeast. The dust-falls observed are very irregularly distributed over the years in question. Of sixty-three, taken at random, there were eight falls of sand and three of sand or dust. Sometimes sand and dust fell simultaneously. The dust-falls with great extent east and west are denser the nearer the African coast. In forty out of sixty-five instances the color of the dust was red. Sometimes there is no coloration. The dry mist of the Dark Sea is in casual connection with the dust-falls. Herr Hellmann concludes from these facts that the dust-material comes principally from Africa and from the Western Sahara. The possibility of occasional admixture of particles from South America is not excluded. The distribution of the dust-falls, both in space and in time (they follow the movements of the trade-winds), supports the hypothesis, as also does the fact that the falling material is coarser in the east than in the west. — *London Times.*

Free Iron in Nature. — Mr. Murray, in examining the deep-sea clays which had been brought home by the Challenger Expedition, found them to contain many particles of native iron, which, on being extracted with a magnet and examined under the microscope, showed structure similar to the structure shown in meteorites. A Swedish observer also collected particles of native iron from the clean snow which fell at a distance from towns. Mr. Banyard, in returning from America, exposed glycerine plates at the prow of the vessel when more than one thousand miles from land, and had caught a single particle of iron which was rather less than the one hundred and twentieth part of an inch in its longest diameter. He was anxious that other observers should repeat the experiment at sea, taking every precaution to keep the plates free from dust in boxes coated on the inside with glycerine.

The Opacity of Flame. — It has been commonly believed that flame is transparent. Some observations have lately been made by M. Van Eyndhoven on the flame of a bat's-wing burner with one of Sugg's photometers, and he found in two experiments a difference of 1.5 candles, or 17 to 18 per cent, between the narrow and the broad side of the flame — the latter giving most light; whence he infers that the flame is not transparent. For this reason the entire luminous power is not obtained from an Argand burner. For good street lighting, the slit of the burner and the direction of the street should be at right angles to each other. — *English Mechanic.*

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